



L C I E

TEST REPORT

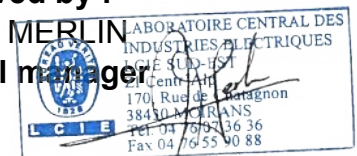
N°: 140157-681884-A (FILE#885407)

Version : 01

Subject	Electromagnetic compatibility and Radio spectrum Matters (ERM) tests according to standards: FCC CFR 47 Part 15, Subpart C RSS-247 Issue 1.0
Issued to	INGENICO Rovaltain TGV – Le Valvert 26300 - ALIXAN FRANCE
Apparatus under test	
↻ Product	Multichargeur pour terminal ISMP Companion
↻ Trade mark	INGENICO
↻ Manufacturer	INGENICO
↻ Model under test	IMP300-MBCW2096
↻ Serial number	14225KT20007435 14225KT20007429
↻ FCCID	XKB-MBISMPGBT
↻ IC	2586D-MBISMPGBT
Conclusion	See Test Program chapter §1
Test date	January 11, 2016 to February 4, 2016
Test location	MOIRANS
IC Test site	6500A-1 & 6500A-3
Composition of document	49 pages
Document issued on	February 15, 2017

Written by :
Jonathan PAUC
Tests operator

Approved by :
Anthony MERLIN
Technical manager



This document shall not be reproduced, except in full, without the written approval of the LCIE. This document contains results related only to the items tested. It does not imply the conformity of the whole production to the items tested. Unless otherwise specified, the decision of conformity takes into account the uncertainty of measurement. This document doesn't anticipate any certification decision.

LCIE

Laboratoire Central des Industries Electriques
Une société de Bureau Veritas

ZI Centr'alp
170 rue de Chatagnon
38430 Moirans FRANCE

Tél : +33 4 76 07 36 36
contact@lcie.fr
www.lcie.fr



PUBLICATION HISTORY

Version	Date	Author	Modification
01	February 15, 2017	Jonathan PAUC	Creation of the document



L C I E

SUMMARY

1.	TEST PROGRAM	4
2.	SYSTEM TEST CONFIGURATION.....	5
3.	CONDUCTED EMISSION DATA.....	8
4.	RADIATED EMISSION DATA	10
5.	MAXIMUM PEAK OUTPUT POWER (15.247)	16
6.	HOPPING CHANNEL SEPARATION (15.247).....	20
7.	NUMBER OF HOPPING FREQUENCIES (15.247).....	24
8.	TIME OF OCCUPANCY (DWELL TIME) (15.247).....	28
9.	BAND EDGE MEASUREMENT (15.247)	32
10.	OCCUPIED BANDWIDTH.....	36
11.	ANNEX 1 (GRAPHS)	38
12.	UNCERTAINTIES CHART	49



1. TEST PROGRAM

Standard:

- FCC Part 15, Subpart C 15.247
- ANSI C63.10 (2013)
- RSS-247 Issue 1.0 – May 2015
- RSS-Gen Issue 4 – Nov 2014

EMISSION TEST	LIMITS			RESULTS (Comments)
	Frequency	Quasi-peak value (dB μ V)	Average value (dB μ V)	
Limits for conducted disturbance at mains ports 150kHz-30MHz	150-500kHz	66 to 56	56 to 46	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
	0.5-5MHz	56	46	
	5-30MHz	60	50	
Radiated emissions 9kHz-30MHz CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	Measure at 300m 9kHz-490kHz : 67.6dB μ V/m /F(kHz) Measure at 30m 490kHz-1.705MHz : 87.6dB μ V/m /F(kHz) 1.705MHz-30MHz : 29.5 dB μ V/m			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP
Radiated emissions 30MHz-26GHz* CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5 Highest frequency : 2480MHz (Declaration of provider)	Measure at 3m 30MHz-88MHz : 40 dB μ V/m 88MHz-216MHz : 43.5 dB μ V/m 216MHz-960MHz : 46.0 dB μ V/m 960MHz-1GHz : 54.0 dB μ V/m 1GHz – 25GHz: 54.0 dB μ V/m (AV) 74.0 dB μ V/m (PK)			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Maximum Peak Output Power CFR 47 §15.247 (b) RSS-247 §5.4	Limit: 21dBm Conducted or Radiated measurement			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Hopping Channel Separation CFR 47 §15.247 (a) (1) RSS-247 §5.1	Minimum between: Two-third 20dB Bandwidth or 25kHz Whichever is greater			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Number of Hopping Frequencies CFR 47 §15.247 (a) (1) (iii) RSS-247 §5.1	At least 15 channels used			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Time of Occupancy (Dwell Time) CFR 47 §15.247 (a) (1) (iii) RSS-247 §5.1	Maximum 0.4 sec within 31.6sec			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Band Edge Measurement CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	Limit: -20dBc			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Occupied bandwidth RSS-Gen §4.6.1	No limit			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Receiver Spurious Emission** RSS-Gen §4.10	See RSS-Gen §4.10			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP

*§15.33: The highest internal source of a testing device is defined like more the highest frequency generated or used in the testing device or on which the testing device works or agrees.

- If the highest frequency of the internal sources of the testing device is lower than 108 MHz, measurement must be only performed until 1GHz.

- If the highest frequency of the internal sources of the testing device ranges between 108 MHz and 500 MHz, measurement must be only performed until 2GHz.

- If the highest frequency of the internal sources of the testing device ranges between 500 MHz and 1 GHz, measurement must be only performed until 5GHz.

If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.

**Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

2. SYSTEM TEST CONFIGURATION

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

IMP300-MBCW2096

Serial Number: 14225KT20007435
14225KT20007429



Photography of EUT

Power supply:

During all the tests, EUT is supplied by $V_{nom}:12Vdc$

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference	Sn
Supply1	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	100-240 _50-60Hz / 12Vdc	VEC50US12	11-15100367-00055

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	DC port (12Vdc)	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Access1	Ethernet port	2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Access2	USB host	/	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	/
Access3	USB slave	/	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	/

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Payment terminal	IMP352-01T2287A	12243PP60050803	/
Payment terminal	IMP322-01T2128B	13213PP20041798	/
Payment terminal	IMP352-01T2287A	13259PP20063235	/
Payment terminal	IMP322-01T2128B	15249PP20627174	/
Payment terminal	IMP352-01T2287A	13257PP20060622	/
Payment terminal	IMP322-01T2128B	15249PP20626726	/



Equipment information:

Bluetooth Classic Type:	<input type="checkbox"/> v1.2	<input type="checkbox"/> v2.0	<input type="checkbox"/> v2.1+EDR	<input checked="" type="checkbox"/> v3.0+HS
	<input type="checkbox"/> v4.0	<input type="checkbox"/> v4.1		<input type="checkbox"/> v4.2
Frequency band:	[2400 – 2483.5] MHz			
Sub-band REC7003:	Annex 3 (a)			
Spectrum Modulation:	<input checked="" type="checkbox"/> FHSS			
Number of Channel:	Maximum:	79	Minimum:	20
Spacing channel:	1MHz			
Channel bandwidth:	1MHz			
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Temporary for test	
Transmit chains:	<input checked="" type="checkbox"/> 1			
	Single antenna			
	Gain 1: 0dBi			
Beam forming gain:	No			
Receiver chains	1			
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined	
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Dwell time:	400ms			
Adaptivity mode:	<input checked="" type="checkbox"/> Yes (Load Based DAA)	<input type="checkbox"/> Off mode	<input type="checkbox"/> No	
	Clear Channel Assessment Time:			/
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty	
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input type="checkbox"/> X°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 55°C	<input type="checkbox"/> X°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input checked="" type="checkbox"/> 230V/50Hz	<input type="checkbox"/> XVdc	
Geo-location capability:	<input type="checkbox"/> Yes (The geographical location determined by the equipment is not accessible to the end user as defined in section 4.3.1.13.2 of ETSI EN 300 328 V1.9.1 standard)			<input checked="" type="checkbox"/> No



2.1. EUT CONFIGURATION

The EUT is set in the following modes during tests with simulator / software SDK9.06 / Configuration YB12A :

- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception

All tests are performed at Cmin, Cmid and Cmax.

2.2. EQUIPMENT MODIFICATIONS

None Modification:

2.3. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
 RA = Receiver Amplitude
 AF = Antenna Factor
 CF = Cable Factor
 AG = Amplifier Gain

Assume a receiver reading of 52.5dB μ V is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m.}$$

2.4. CALIBRATION DATE

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period

3. CONDUCTED EMISSION DATA

3.1. ENVIRONMENTAL CONDITIONS

Date of test : January 11, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 990
Relative humidity (%) : 31
Ambient temperature (°C) : 21

3.2. TEST SETUP

Mains terminals

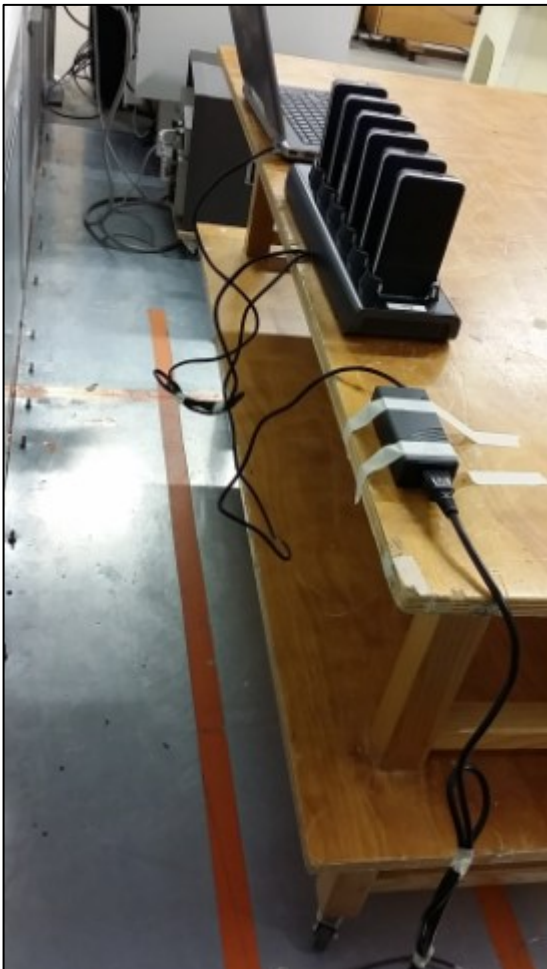
The EUT and auxiliaries are set:

- 80cm above the ground on the non-conducting table (Table-top equipment)
- 10cm above the ground on isolating support (Floor standing equipment)

The distance between the EUT and the LISN is 80cm. The EUT is 40cm away for the vertical ground plane.

The EUT is powered by V_{nom} .

The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.



Test setup



3.3. TEST METHOD

The product has been tested according to ANSI C63.10 and FCC Part 15 subpart C. The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 subpart C limits. Measurement bandwidth was 9kHz from 150kHz to 30MHz. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50μH. The Peak data are shown on plots in annex 1. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured. Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

Measurements are performed on the phase (L1) and neutral (N) of power line voltage. Graphs are obtained in PEAK detection. Measures are also performed in Quasi-Peak and Average for any strong signal.

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable + self	-	-	A5329578	07/15	07/16
Conducted emission comb generator	BARDET	-	A3169049	-	-
ISN 4 wires	TESEQ	T400A	C2320124	06/15	06/17
LISN	RHODE & SCHWARZ	ENV216	C2320291	11/15	11/16
Load 50Ω - BNC	AEROFLEX	-	A7152071	04/15	04/16
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	04/15	04/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

3.6. TEST RESULTS

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Results: (PEAK detection)

Graph identifier	Line	Mode	Comments
Emc# 1	L	Charging mode & Bluetooth hopping	See annex 1
Emc# 2	N	Charging mode & Bluetooth hopping	See annex 1

3.7. CONCLUSION

Conducted emission data measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007435, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

4. RADIATED EMISSION DATA

4.1. ENVIRONMENTAL CONDITIONS

Date of test	: January 12, 2016	January 22, 2016
Test performed by	: Jonathan PAUC	Jonathan SARTO
Atmospheric pressure (hPa)	: 994	1006
Relative humidity (%)	: 31	27
Ambient temperature (°C)	: 21	19

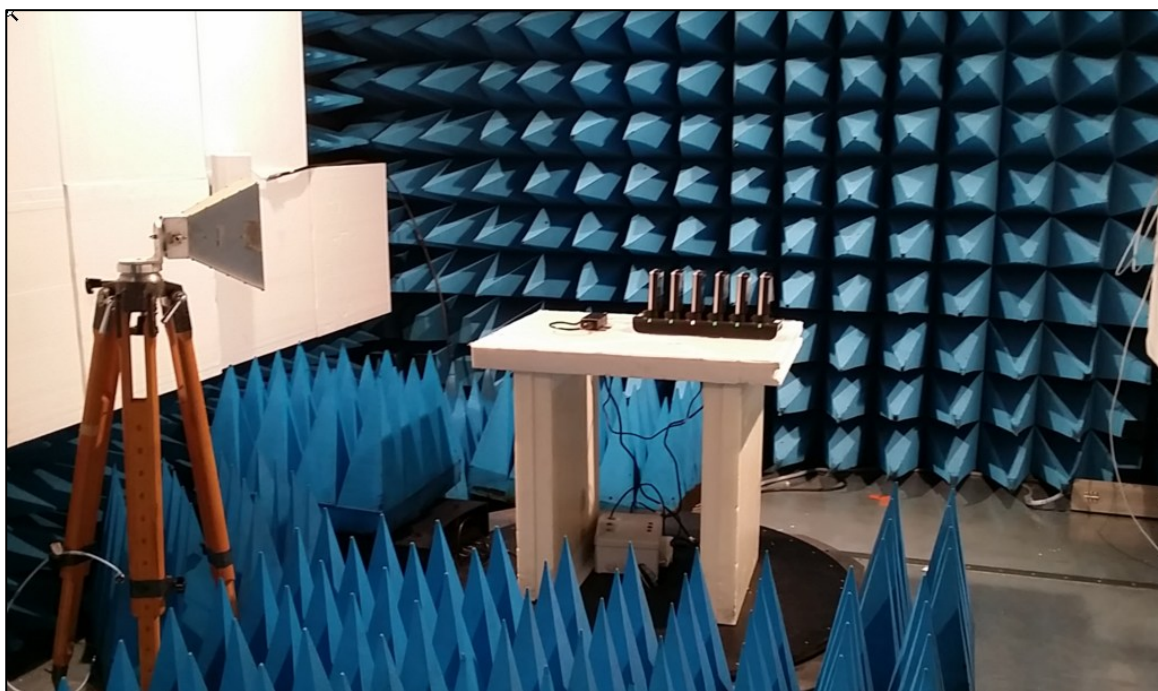
4.2. TEST SETUP

The installation of EUT is identical for pre-characterization measures in a 3 meters semi- anechoic chamber and for measures on the 10 meters Open site.

The EUT and auxiliaries are set:

- 80cm above the ground on the non-conducting table (Table-top equipment) - Below 1GHz
- 150cm above the ground on the non-conducting table (Table-top equipment) - Above 1GHz
- 10cm above the ground on isolating support (Floor standing equipment)

The EUT is powered by V_{nom} .



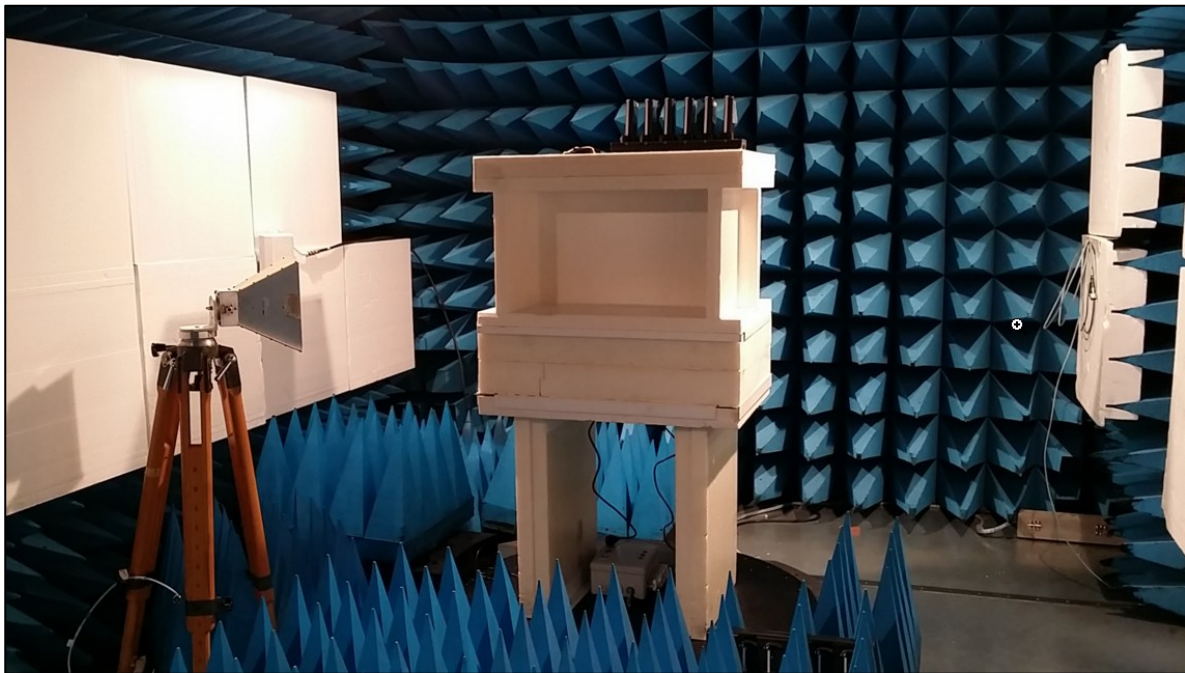
Test setup in anechoic chamber <1GHz



L C I E



Test setup in anechoic chamber <1GHz



Test setup in anechoic chamber >1GHz



L C I E



Test setup on OATS



4.3. TEST METHOD

The product has been tested according to ANSI C63.10, FCC part 15 subpart C.

Characterization on 10 meters open site from 30MHz to 1GHz:

Radiated Emissions were measured on an open area test site. A description of the facility is on file with the FCC. The product has been tested at a distance of **10 meters** from the antenna and compared to the FCC part 15 subpart C limits. Measurement bandwidth was 9kHz below 30MHz and 120kHz from 30 MHz to 1GHz. Test is performed in horizontal (H) and vertical (V) polarization, the loop antenna was rotated during the test to maximize the emission measurement. The height antenna is varied from 1m to 4m. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration. A summary of the worst case emissions found in all test configurations and modes is shown. Frequency list has been created with anechoic chamber pre-scan results.

Characterization on 3 meters full anechoic chamber from 1GHz to 26GHz:

The product has been tested at a distance of **3 meters** from the antenna and compared to the FCC part 15 subpart C limits. Measurement bandwidth was 1MHz from 1GHz to 26GHz.

Test is performed in horizontal (H) and vertical (V) polarization. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration. A summary of the worst case emissions found in all test configurations and modes is shown. The height antenna is

- On mast, varied from 1m to 4m
 - Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)
- Frequency list has been created with anechoic chamber pre-scan results.

NOTE:

1. Average value = Peak value + 20 Log (duty cycle) = Peak value – 30.1dB.
2. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on $0.625 * 5$ per 296.25 ms per channel. Therefore, the duty cycle correction factor be equal to: $20\log(3.125/100) = -30.1$ dB.



4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Amplifier 8-26GHz	ALDETEC	ALS01452	A7085007	08/15	08/16
Antenna Bi-log	CHASE	CBL6111A	C2040172	06/15	06/17
Antenna horn	RAVEN ENGINEERING	96001	C2042046	04/15	04/16
Cable Measure @3m 18GHz	-	-	A5329038	08/14	08/15
Cable Measure @3m	-	-	A5329206	04/15	04/16
Semi-Anechoic chamber #3	SIEPEL	-	D3044017	04/13	04/16
Radiated emission comb generator	BARDET	-	A3169050	-	-
HF Radiated emission comb generator	LCIE SUD EST	-	A3169088	-	-
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	04/15	04/16
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	04/15	04/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	-	-
Table	LCIE	-	F2000461	-	-

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

4.6. TEST RESULTS

4.6.1. Pre-characterization at 3 meters [30MHz-1GHz]

See graphs for 30MHz-1GHz:

Graph identifier	Polarization	Mode	EUT position	Comments
Emr# 1	H & V	Charging Mode	Axis XY	See annex 1

Graph identifier	Polarization	Mode	EUT position	Channel	Comments
Emr# 2	H & V	TX	Axis XY	Min	See annex 1
Emr# 3	H & V	TX	Axis XY	Mid	See annex 1
Emr# 4	H & V	TX	Axis XY	Max	See annex 1

4.6.2. Pre-characterization at 3 meters [1GHz-26GHz]

See graphs for 1GHz-12.75GHz:

Graph identifier	Polarization	Mode	EUT position	Comments
Emr# 5	H	Charging Mode	Axis XY	See annex 1
Emr# 6	V	Charging Mode	Axis XY	See annex 1

Graph identifier	Polarization	Mode	EUT position	Channel	Comments
Emr# 7	H & V	TX	Axis XY	Min	See annex 1
Emr# 8	H & V	TX	Axis XY	Mid	See annex 1
Emr# 9	H & V	TX	Axis XY	Max	See annex 1

For measurements above 12.75GHz, see complementary tests, band edge measurements.



4.6.3. Characterization on 10 meters open site from 30MHz to 1GHz

Worst case final data result:

Frequency list has been created with semi-anechoic chamber pre-scan results. Measurements are performed using a QUASI-PEAK detection.

No	Frequency (MHz)	Limit QPeak (dBµV/m)	Measure QPeak (dBµV/m)	Margin QPeak (dB)	Angle Table (°)	Pol. Ant.	Ht. Ant. (cm)	FC (dB)	Remark
1	36.120	40.0	33.5	-6.5	310	V	360	16.4	/
2	37.300	40.0	31.0	-9.0	360	V	150	15.8	/
3	43.700	40.0	28.1	-11.9	120	V	100	12.3	/
4	66.300	40.0	31.9	-8.1	180	V	200	7.8	/
5	125.000	43.5	38.8	-4.7	100	V	100	13.8	/
6	150.000	43.5	37.4	-6.1	0	V	220	13.4	/
7	225.000	46.0	39.5	-6.5	160	H	400	13.3	/
8	250.000	46.0	40.9	-5.1	151	H	270	15.5	/
9	290.300	46.0	39.1	-6.9	250	V	160	16.3	/
10	387.000	46.0	38.7	-7.3	30	H	160	19.3	/
11	497.400	46.0	39.9	-6.1	290	V	100	22.1	/
12	507.100	46.0	40.5	-5.5	260	V	100	22.3	/

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)
($M@3m = M@10m+10.5dB$)

4.6.4. Characterization on 3meters anechoic chamber from 1GHz to 12.75GHz

Worst case final data result:

The frequency list is created from the results obtained during the pre-characterization in anechoic chamber. Measurements are performed using a PEAK and AVERAGE detection.

Charging Mode												
No	Frequency (MHz)	Limit Peak (dBµV/m)	Measure Peak (dBµV/m)	Margin Peak (dB)	Limit Average (dBµV/m)	Measure Average (dBµV/m)	Margin Average (dB)	Angle Table (°)	Pol. Ant.	Ht. Ant. (cm)	FC (dB)	Remark
1	1041.2	74.0	50.4	-23.6	54.0	40.4	-13.6	94	V	100	26.4	/
2	1257.4	74.0	48.7	-25.3	54.0	42.7	-11.3	86	V	100	26.7	/
3	1451.7	74.0	53.3	-20.7	54.0	49.0	-5.0	88	V	100	27.0	/

TX – Worst case see §9												
No	Frequency (MHz)	Limit Peak (dBµV/m)	Measure Peak (dBµV/m)	Margin Peak (dB)	Limit Average (dBµV/m)	Measure Average (dBµV/m)	Margin Average (dB)	Angle Table (°)	Pol. Ant.	Ht. Ant. (cm)	FC (dB)	Remark
1	4804.000	74.0	58.7	-15.3	54.0	28.6	-25.4	146	V	150	3.7	/
2	4960.000	74.0	61.0	-13.0	54.0	30.9	-23.1	118	V	150	4.0	/
3	4881.610	74.0	59.8	-14.2	54.0	29.7	-24.3	145	V	150	3.8	/
4	1602.350	74.0	36.3	-37.7	54.0	20.9	-33.1	130	V	150	-5.1	/
5	7322.970	74.0	51.3	-22.7	54.0	40.5	-13.5	0	H	150	7.7	/
6	7439.760	74.0	49.6	-24.4	54.0	33.4	-20.6	0	V	150	8.0	/

4.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007435, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



5. MAXIMUM PEAK OUTPUT POWER (15.247)

5.1. ENVIRONMENTAL CONDITIONS

Date of test : February 1, 2016
 Test performed by : Jonathan PAUC
 Atmospheric pressure (hPa) : 990
 Relative humidity (%) : 37
 Ambient temperature (°C) : 21

5.2. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented
 Hopping sequence: ON OFF

5.3. TEST SETUP

Conducted measurement:

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10MHz VBW.
 The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Radiated measurement:

The product has been tested at a distance of 3 meters from the antenna and using 3MHz RBW and 10MHz VBW. Antenna height search was performed from 1m to 4m for both horizontal and vertical polarization. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT. A summary of the worst case emissions found in all test configurations and modes is shown on following table. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.
 To demonstrate compliance with peak output power requirement of section 15.247 (b), the transmitter's peak output power is calculated using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where:

- E is the measured maximum fundamental field strength in V/m, utilizing a RBW ≥ the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.
- G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
- d is the distance in meters from which the field strength was measured.
- P is the power in watts for which you are solving:

$$P = \frac{(Ed)^2}{30G}$$

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329636	01/16	01/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
RSCCommander	R&S	v1.6.4	L1000116	-	-

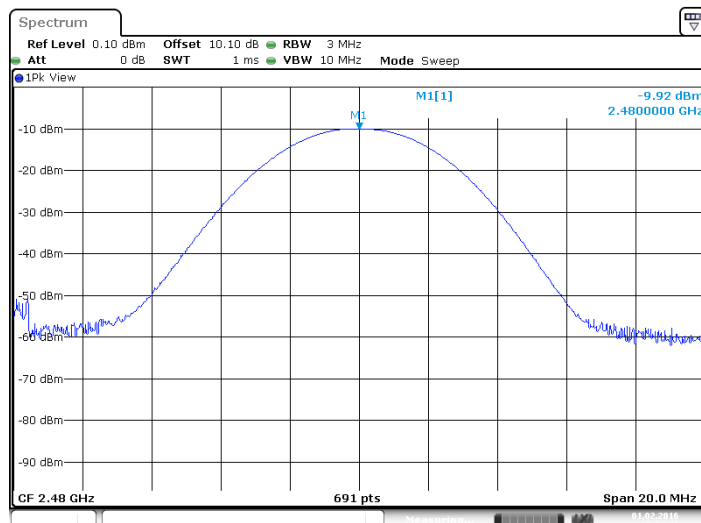
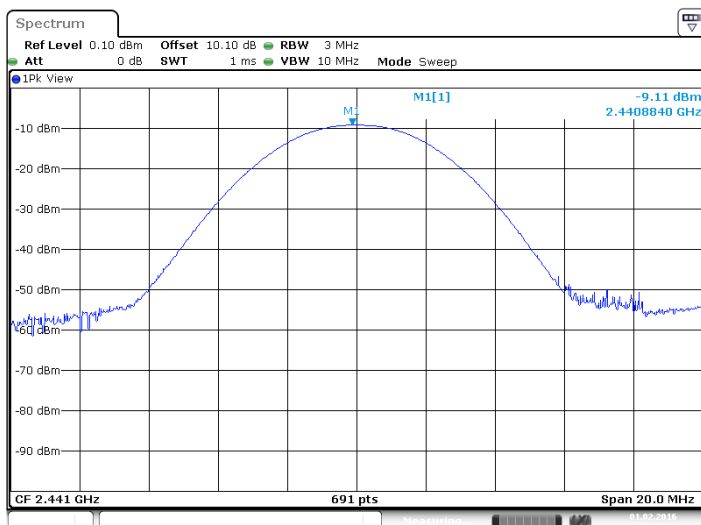
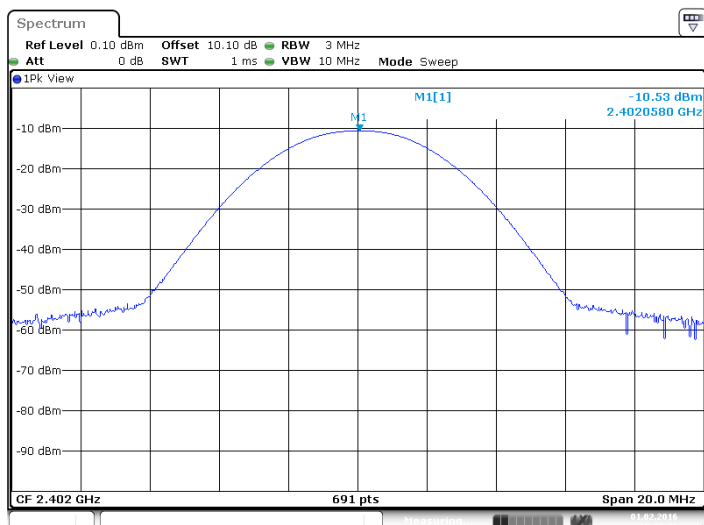
5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence

5.6. TEST RESULTS

FSK DH5

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	-10.5	21
39	2441	-9.1	21
78	2480	-9.9	21

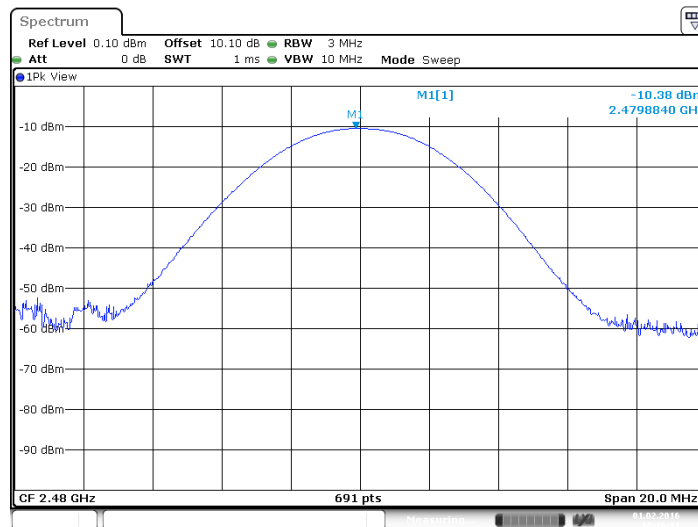
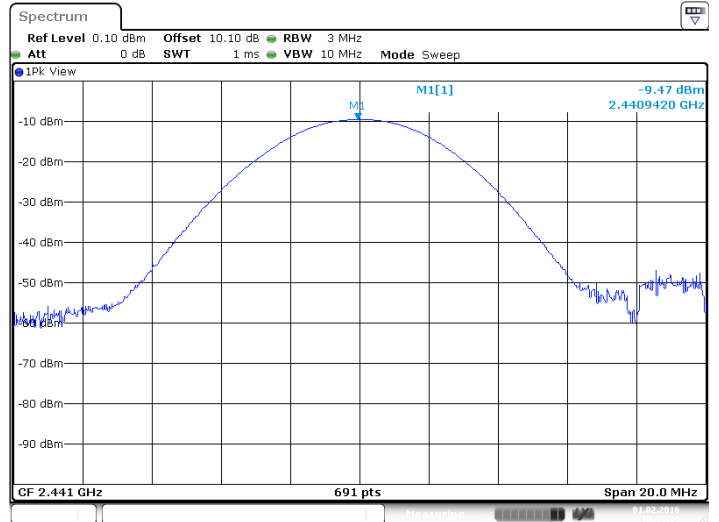
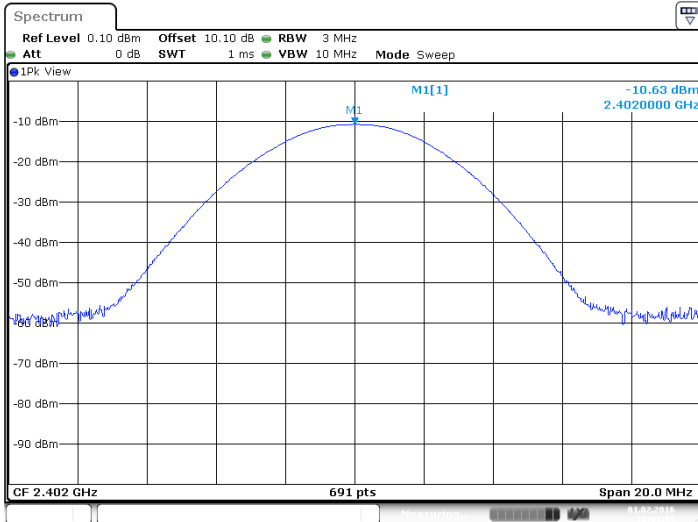




L C I E

$\pi/4$ DQPSK 2-DH5

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	-10.6	21
39	2441	-9.5	21
78	2480	-10.4	21

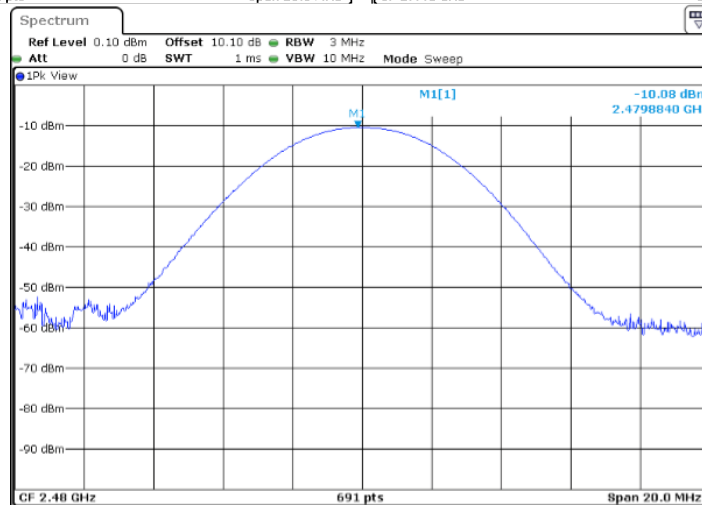
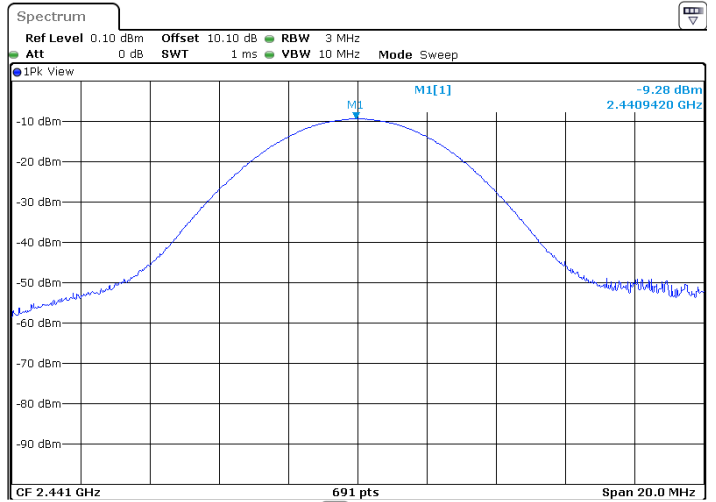
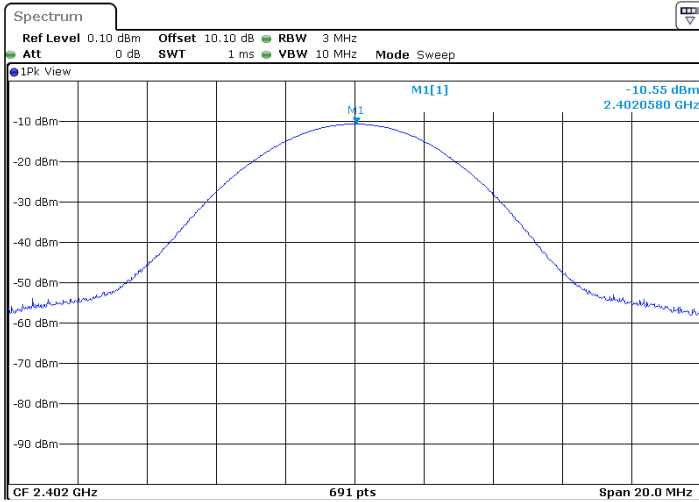




L C I E

8DPSK 3-DH5

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	-10.5	21
39	2441	-9.3	21
78	2480	-10.1	21



5.7. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT2000742914225KT20007435, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



6. HOPPING CHANNEL SEPARATION (15.247)

6.1. ENVIRONMENTAL CONDITIONS

Date of test : February 1, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 990
Relative humidity (%) : 37
Ambient temperature (°C) : 21

6.2. LIMIT

For frequency hopping system, hopping channel carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

For frequency hopping system operating in the 2400-2483.5MHz, if the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB Bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

For frequency hopping system operating in the 902-928MHz with 20dB bandwidth of hopping channel is less than 250kHz:

- System shall use at least 50 channels
- Average time of occupancy on any frequency shall not greater than 0.4s within 20s period

For frequency hopping system operating in the 902-928MHz with 20dB bandwidth of hopping channel is equal or greater than 250kHz:

- System shall use at least 25 channels
- Average time of occupancy on any frequency shall not greater than 0.4s within 10s period

The maximum allowed 20dB bandwidth of hopping channel is 500kHz.

6.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5
Hopping sequence: ON OFF

6.4. SETUP – 20DB BANDWIDTH

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the frequency separation of two frequencies that were attenuated 20dB from the Peak Output Power level. A delta marker is used to measure the frequency difference as the emission bandwidth.

6.5. SETUP – ADJACENT CHANNEL SEPARATION

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the separation of two adjacent channels is recorded. A delta marker is used to measure the frequency difference.

6.6. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329636	01/16	01/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
RSCommander	R&S	v1.6.4	L1000116	-	-



L C I E

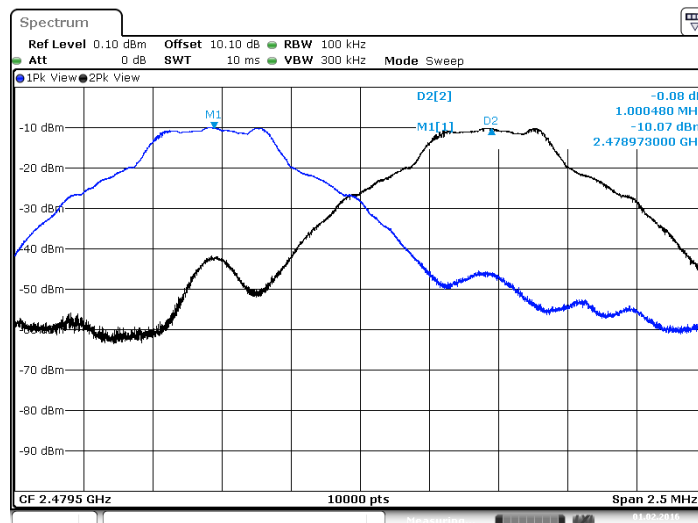
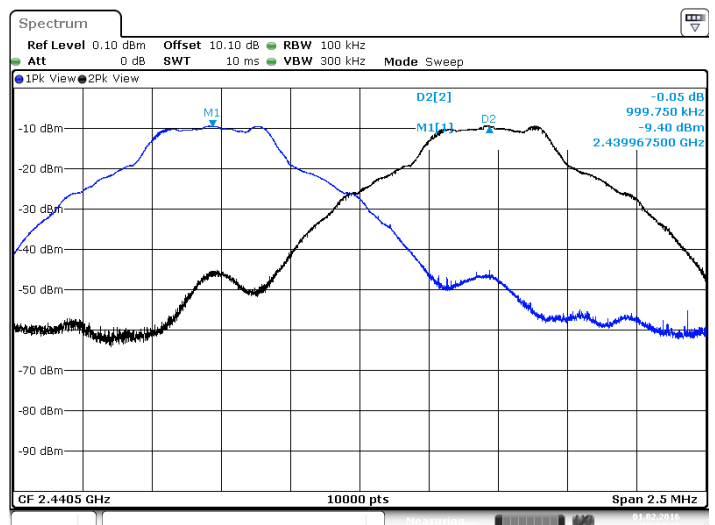
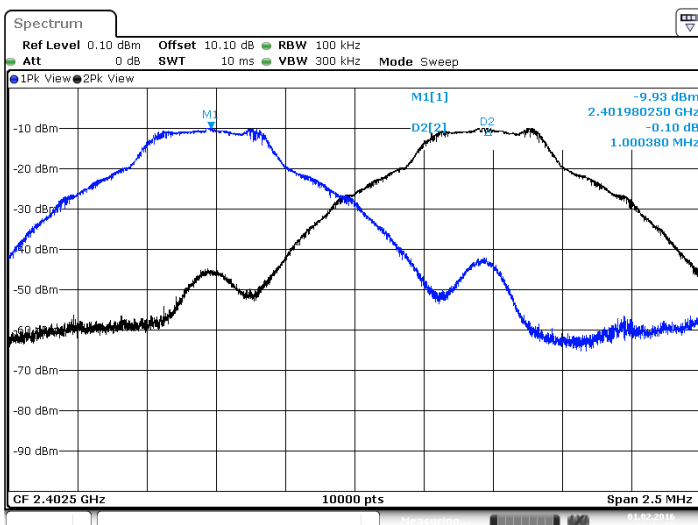
6.7. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

6.8. TEST SEQUENCE AND RESULTS

Modulation: FSK DH5

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)	PASS / FAIL
0	2402	1.000	0.843	0.562	PASS
39	2441	0.999	0.842	0.561	PASS
78	2480	1.000	0.863	0.575	PASS

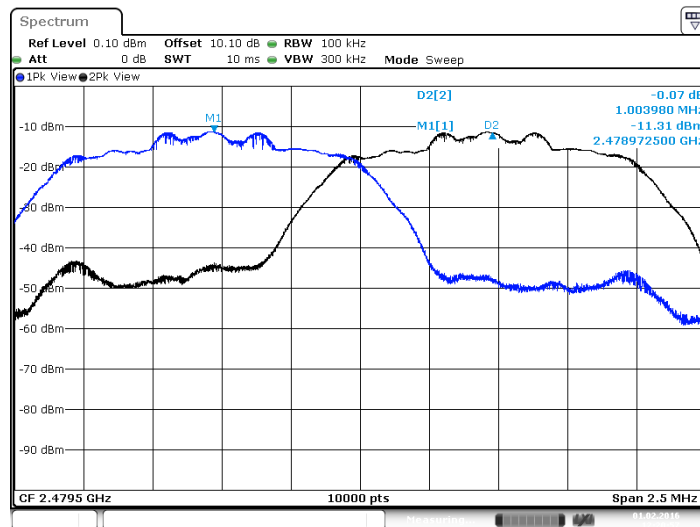
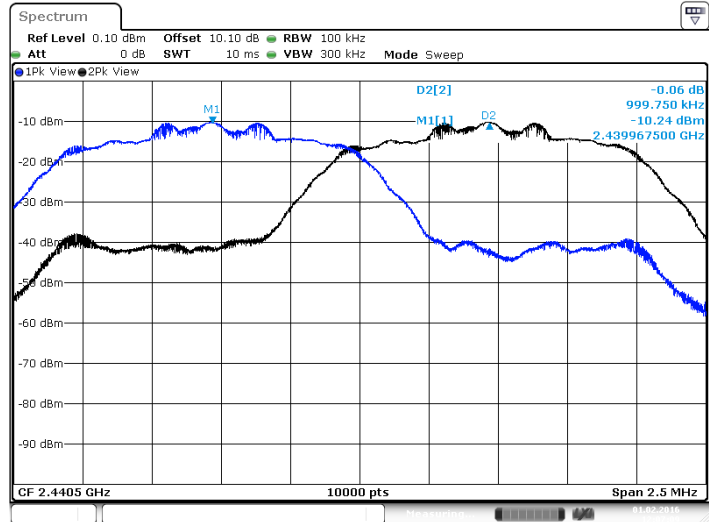
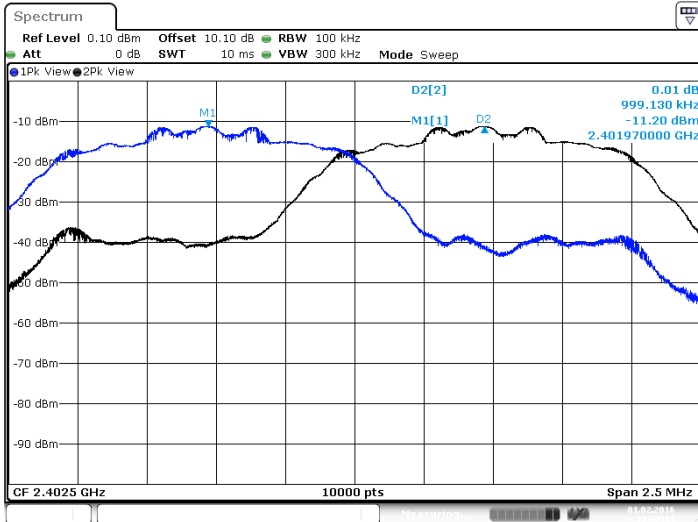




L C I E

Modulation: $\pi/4$ DQPSK 2-DH5

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)	PASS / FAIL
0	2402	0.999	1.215	0.810	PASS
39	2441	0.999	1.220	0.813	PASS
78	2480	1.004	1.187	0.791	PASS



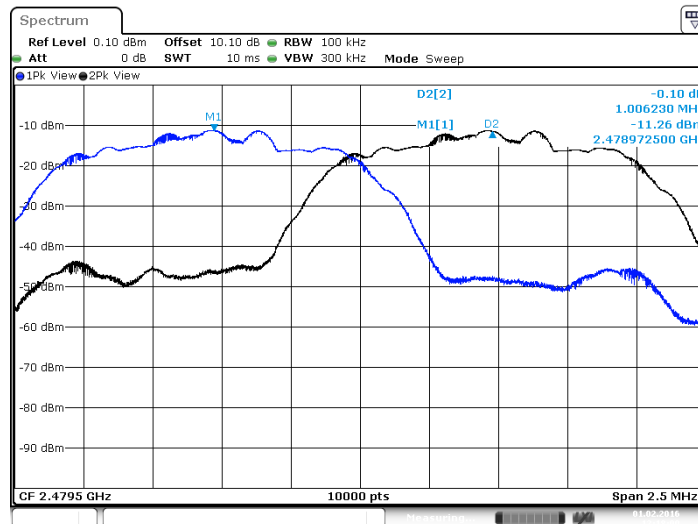
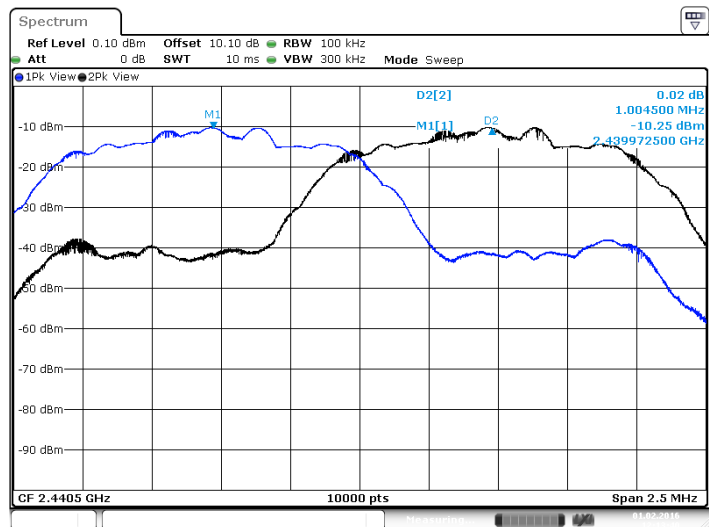
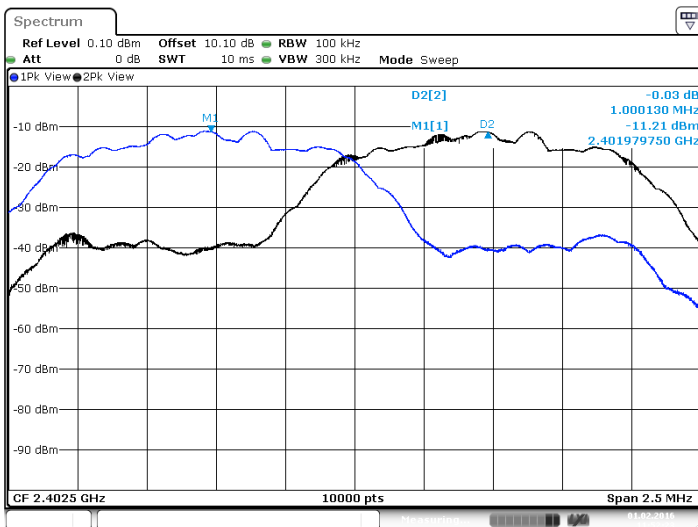


L C I E

Modulation: 8DPSK 3-DH5

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)	PASS / FAIL
0	2402	1.000	1.258	0.839	PASS
39	2441	1.004	1.200	0.800	PASS
78	2480	1.005	1.224	0.816	PASS

Limit used: 25kHz / Two-third 20dB Bandwidth



6.9. CONCLUSION

Hopping Channel Separation measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007429, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



7. NUMBER OF HOPPING FREQUENCIES (15.247)

7.1. ENVIRONMENTAL CONDITIONS

Date of test : February 1, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 990
Relative humidity (%) : 34
Ambient temperature (°C) : 23

7.2. LIMIT

For frequency hopping system operating in the 2400-2483.5MHz, at least 15 channels frequencies must be used and should be equally spaced.

7.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5
Hopping sequence: ON OFF

7.4. SETUP

The EUT is placed in an anechoic chamber. The EUT is turn ON and using the MaxHold function and a delta marker the number of frequencies used for this FHSS system is recorded, see following graphs.

RBW: 100kHz
VBW: 300kHz

7.5. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329636	01/16	01/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
RSCommander	R&S	v1.6.4	L1000116	-	-

7.6. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

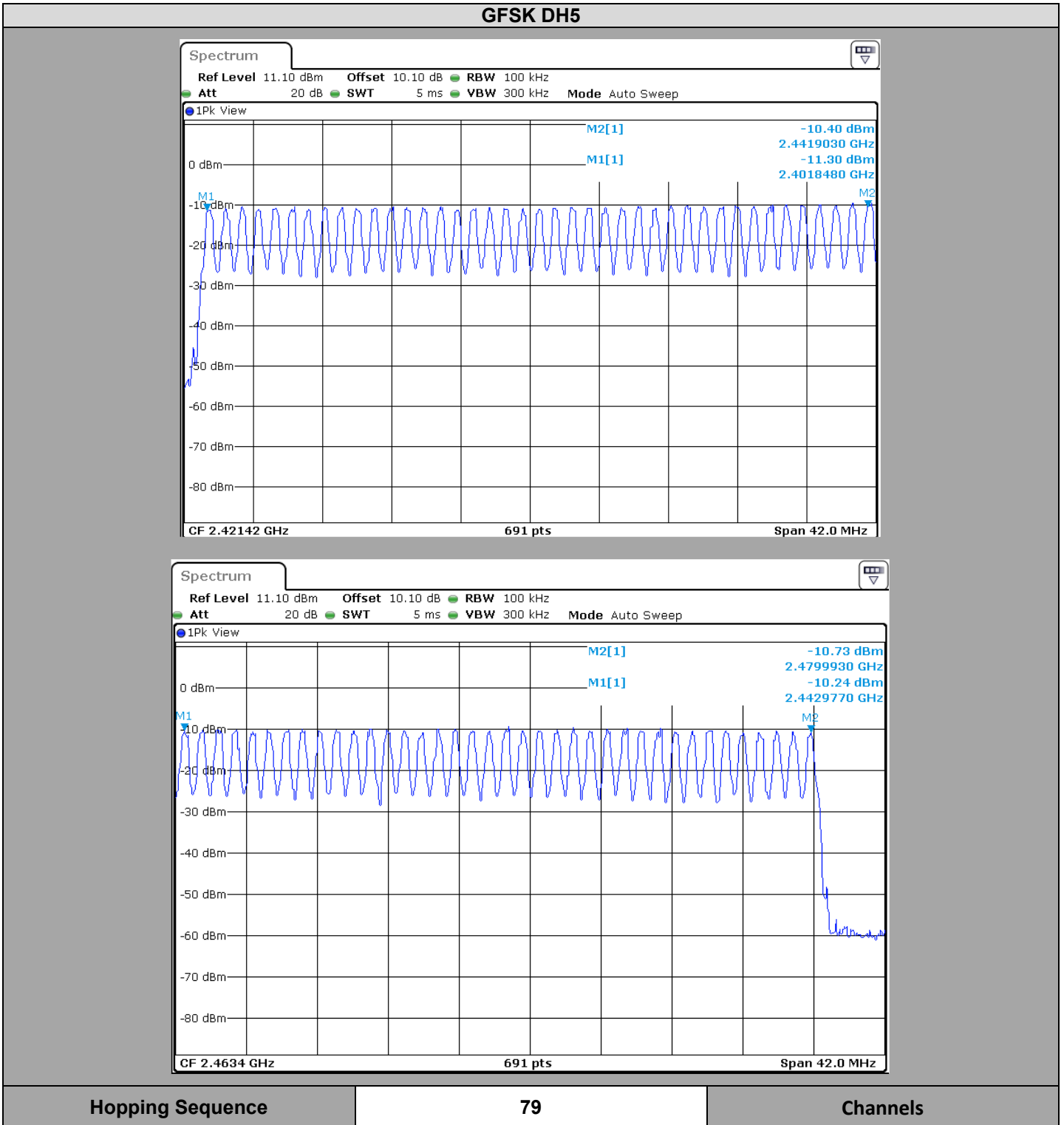
None Divergence:



L C I E

7.7. TEST SEQUENCE AND RESULTS

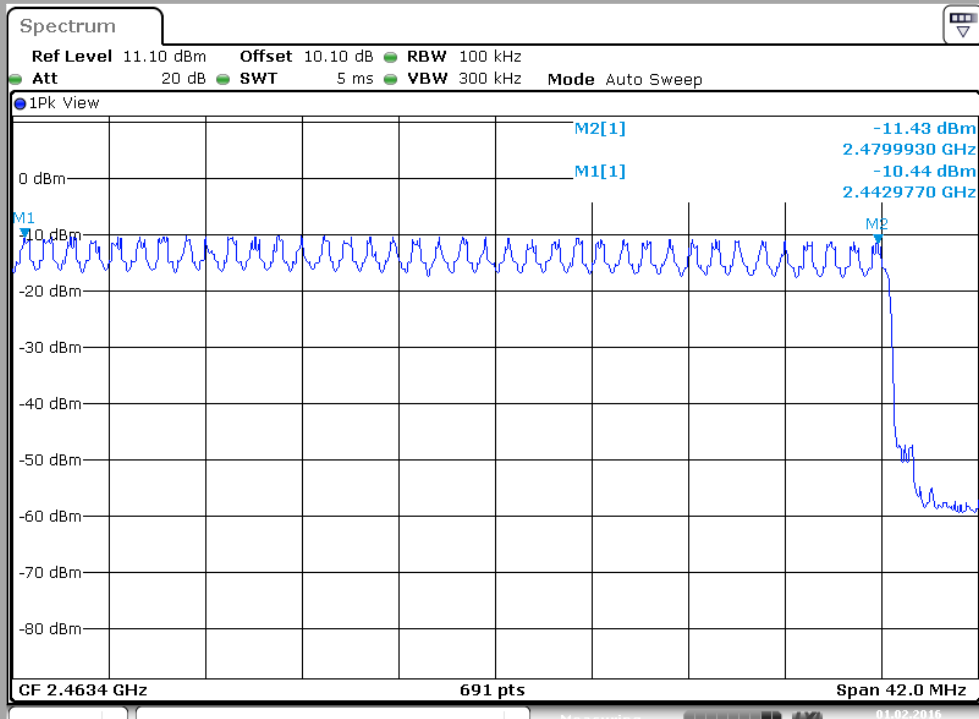
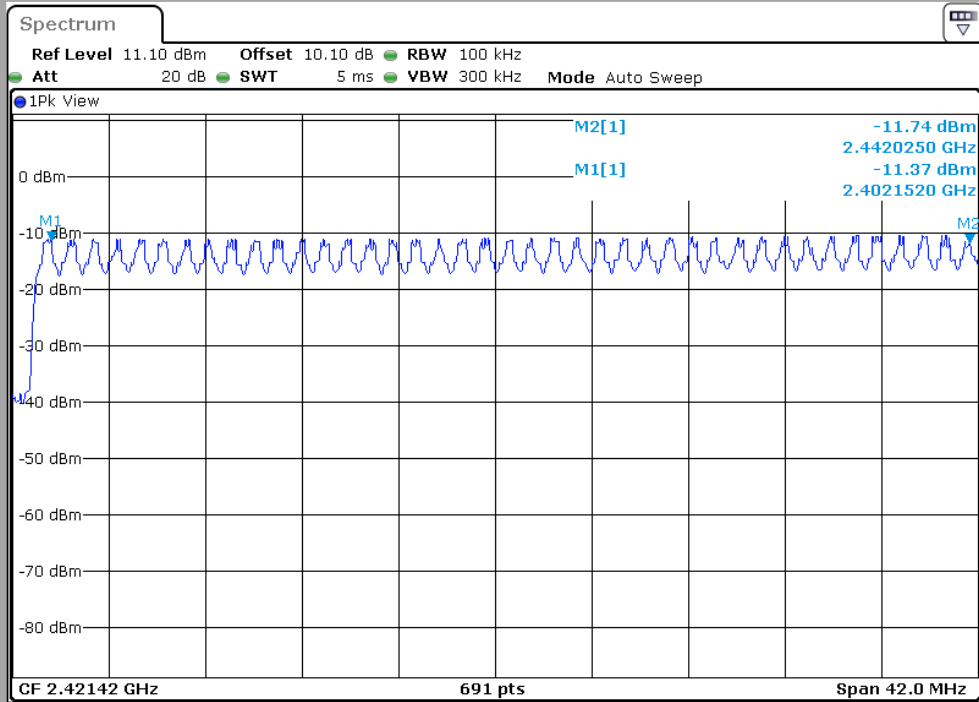
GRAPH – MODULATION





L C I E

$\pi/4$ DQPSK 2-DH5



Hopping Sequence

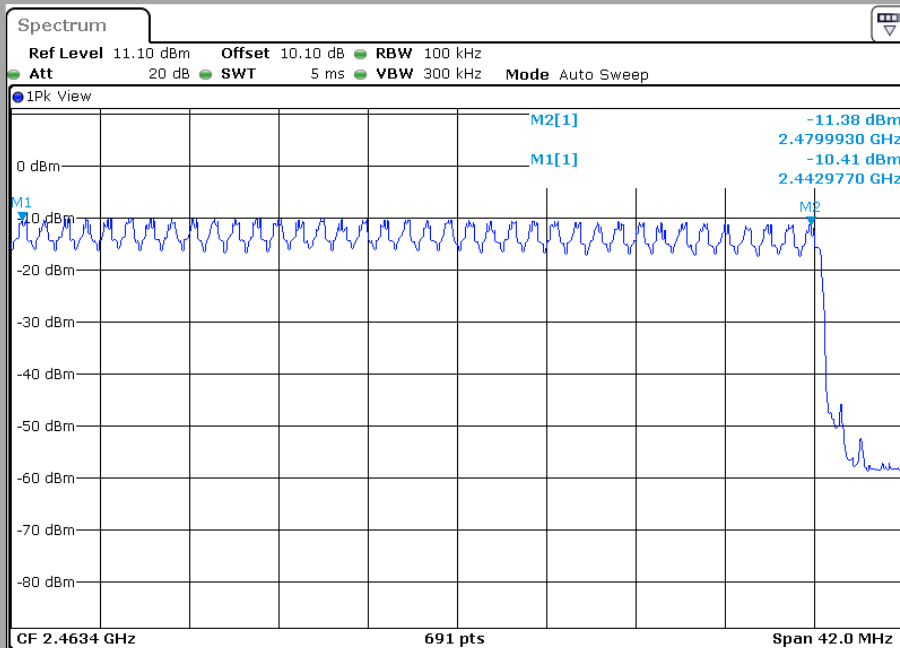
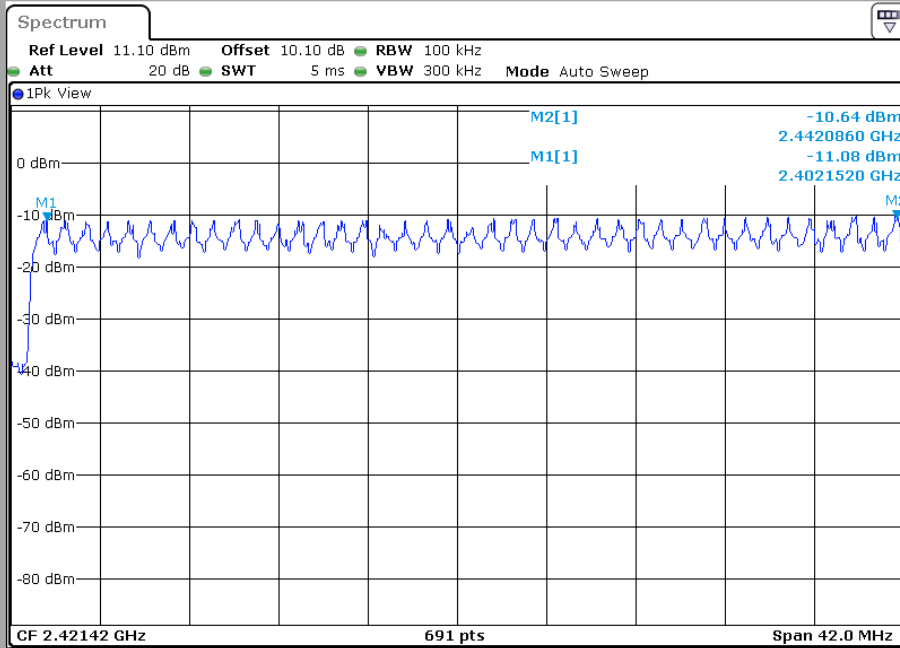
79

Channels



L C I E

8DPSK 3-DH5



Hopping Sequence

79

Channels

Number of frequency used in the hopping sequence:

7.8. CONCLUSION

Number of hopping frequencies measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007429, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



8. TIME OF OCCUPANCY (DWELL TIME) (15.247)

8.1. ENVIRONMENTAL CONDITIONS

Date of test : February 1, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 990
Relative humidity (%) : 24
Ambient temperature (°C) : 21

8.2. LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within period of 0.4 seconds multiplied by the number of hopping channels employed.

8.3. EQUIPMENT CONFIGURATION

Packet type: 3-DH1 / 3-DH3 / 3-DH5 worst case presented
Hopping sequence: ON OFF

8.4. SETUP

Conducted measurement:

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Radiated measurement:

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Measurement Procedure:

Dwell Time is measured and calculated using the zero SPAN mode on a channel frequency and a SWEEP with an adapter value to measure the number of transmission within a period and the time of transmission

RBW: 100kHz

VBW: 300kHz

8.5. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329636	01/16	01/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
RSCommander	R&S	v1.6.4	L1000116	-	-

8.6. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

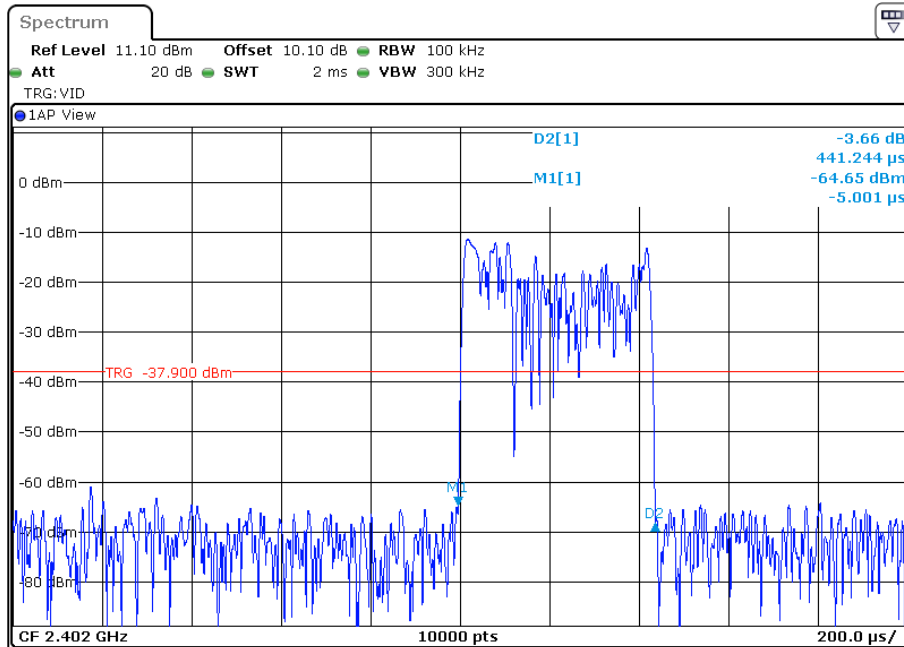
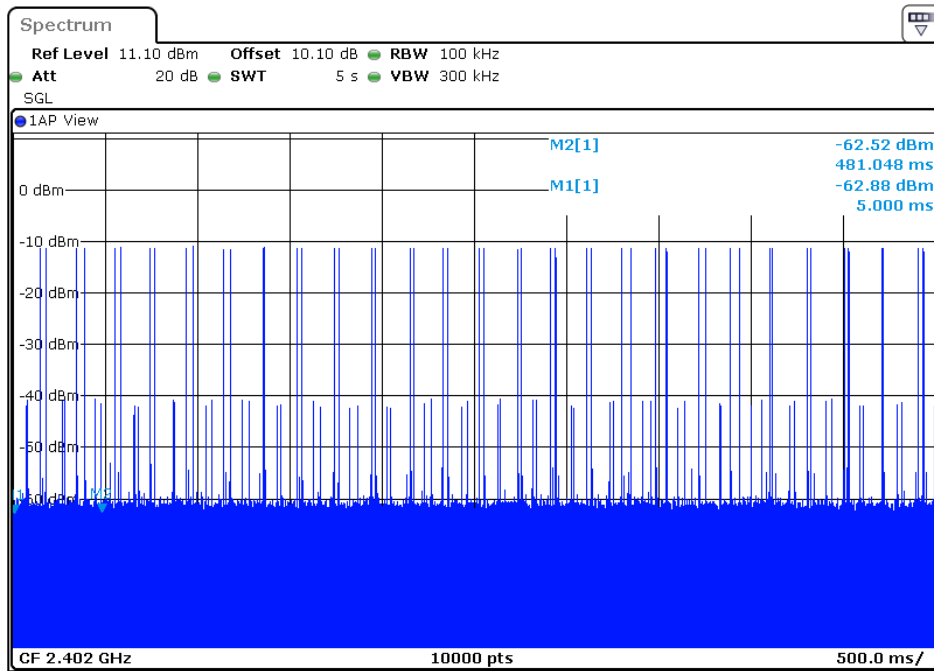
None Divergence:



L C I E

8.7. TEST SEQUENCE AND RESULTS

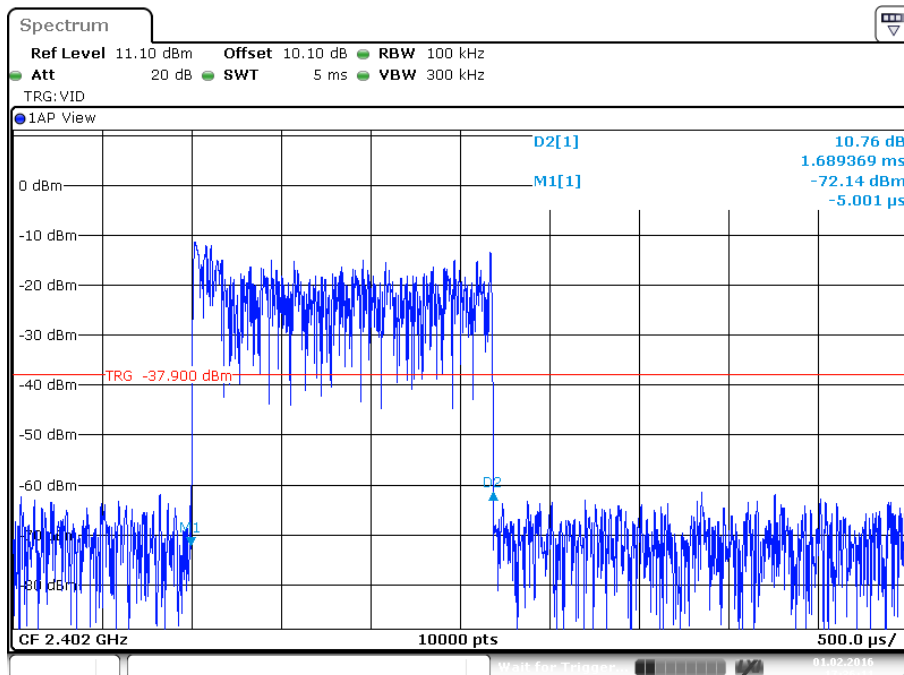
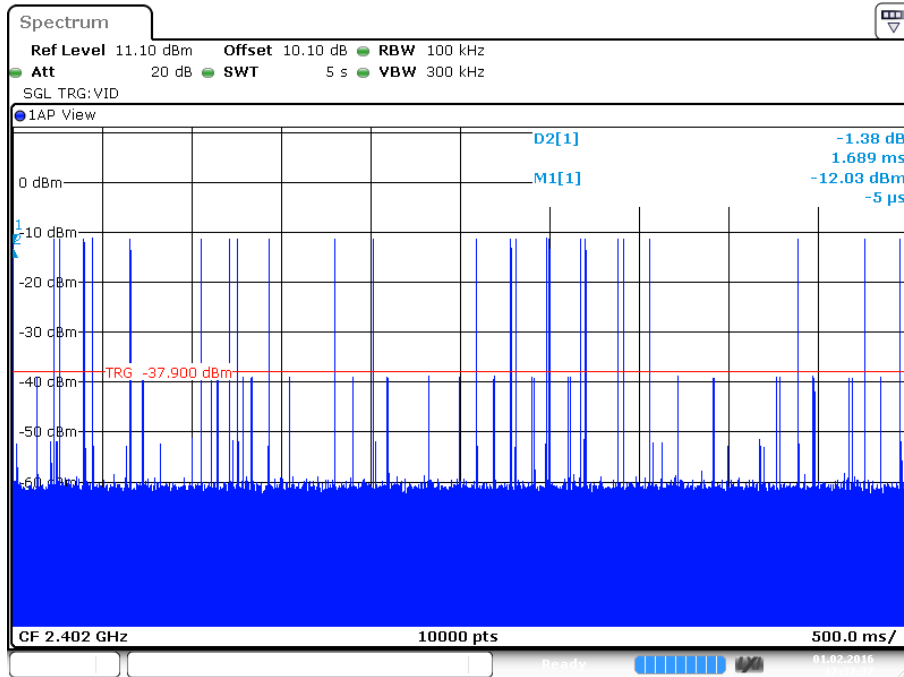
Packet Mode	Number of transmission in the period 31.6s = (79 Hopping * 0.4)	Length of transmission time (ms)	Result (ms)	Limit (ms)	PASS / FAIL
3-DH1	50 (times/ 5 sec) * 6.32 = 316 times	0.441	139.36	400	PASS





L C I E

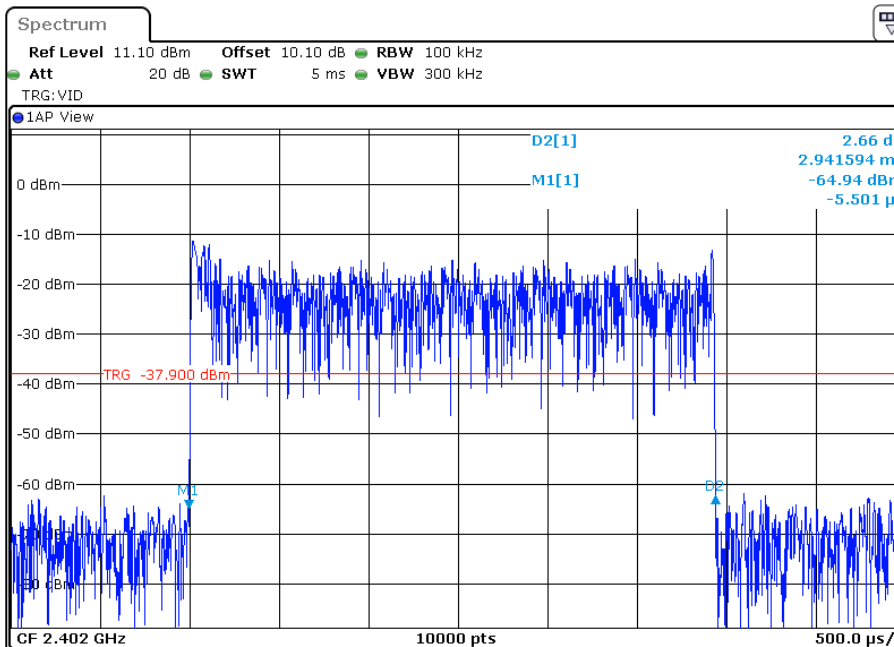
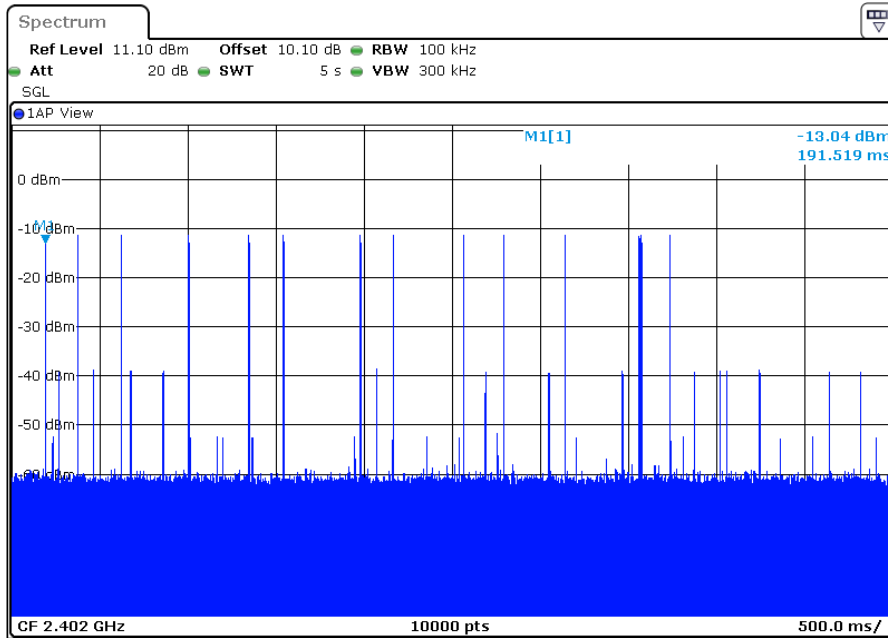
Packet Mode	Number of transmission in the period 31.6s = (79 Hopping * 0.4)	Length of transmission time (ms)	Result (ms)	Limit (ms)	PASS / FAIL
3-DH3	25 (times/ 5 sec) * 6.32 = 158 times	1.689	266.86	400	PASS





L C I E

Packet Mode	Number of transmission in the period	Length of transmission time (ms)	Result (ms)	Limit (ms)	PASS / FAIL
DH5	15 (times/ 5 sec) * 6.32 = 95 times	2.941	279.4	400	PASS



Note: Period of 31.6 seconds (79 channels x 0.4)

8.8. CONCLUSION

Time of occupancy measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007429, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



9. BAND EDGE MEASUREMENT (15.247)

9.1. ENVIRONMENTAL CONDITIONS

Date of test : January 1, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 990
Relative humidity (%) : 24
Ambient temperature (°C) : 21

9.2. LIMIT

RF antenna conducted test:

Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB. For -20dBc limit, lowest power output level is considered, worst case.

Radiated emission test:

Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See results in Radiated emissions section before.

9.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented
Hopping sequence: ON OFF

9.4. SETUP

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with Peak Output Power measurement. The EUT is turn ON; the graphs of the restrict frequency band are recorded with a display line indicating the highest level and other the 20dB offset below to show compliance with 15.247 (d) and 15.205. The emissions in restricted bands are compared to 15.209 limits.

RBW: 100kHz
VBW: 300kHz



9.5. TEST EQUIPMENT LIST

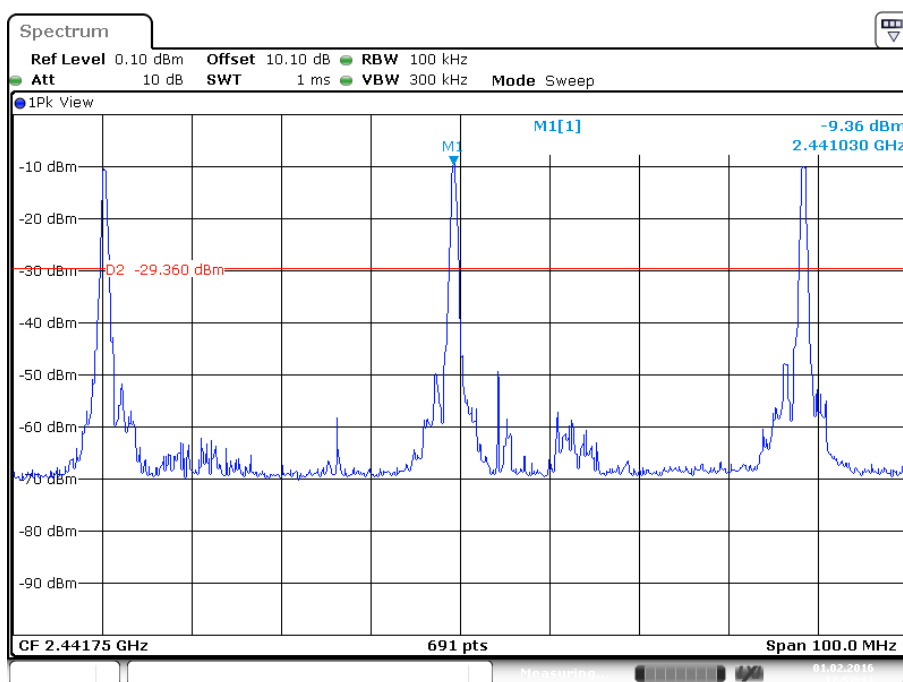
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329636	01/16	01/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
RSCCommander	R&S	v1.6.4	L1000116	-	-

9.6. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

9.7. TEST SEQUENCE AND RESULTS

GRAPH / MODULATION.



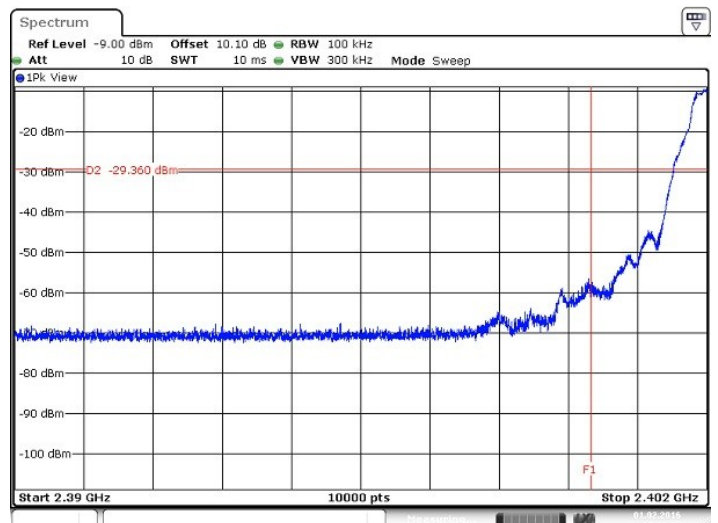
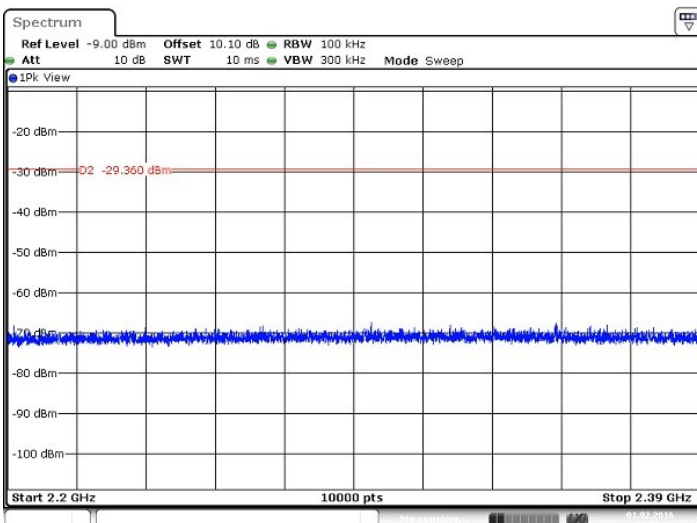
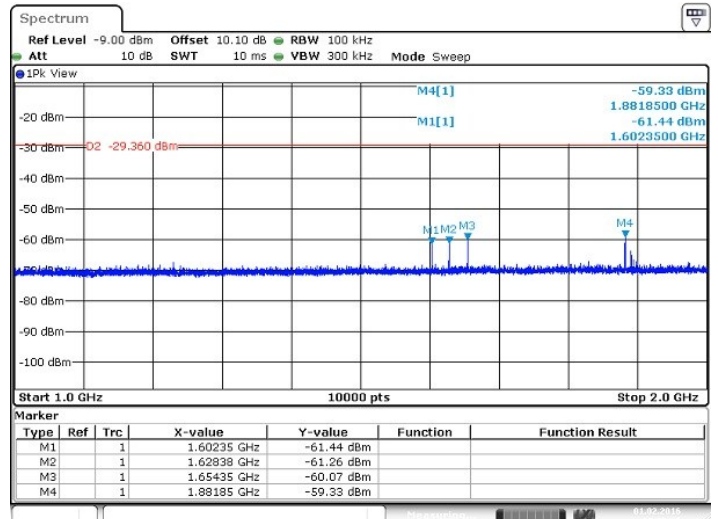
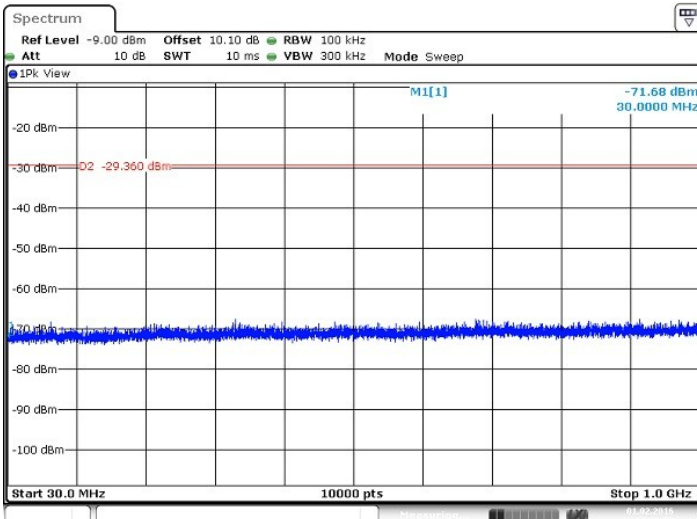
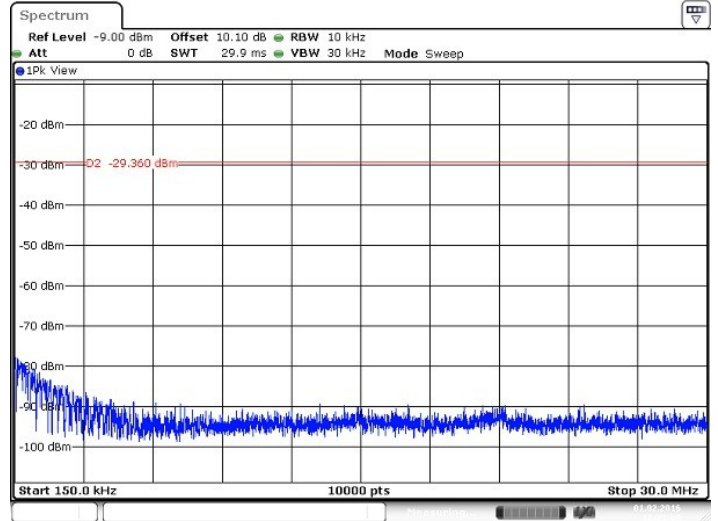
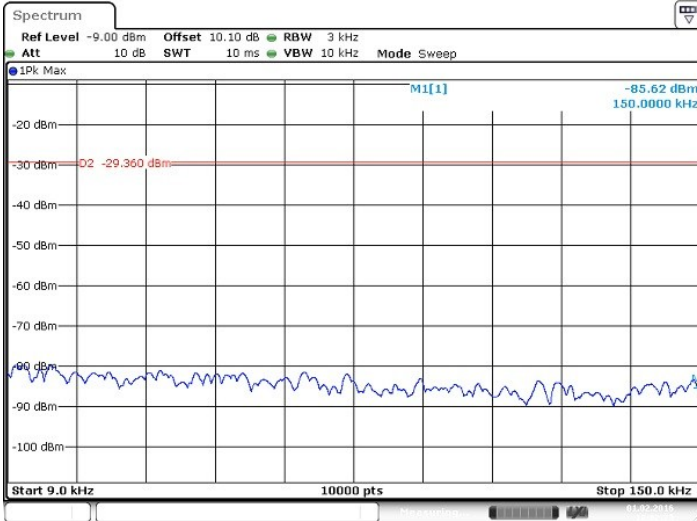
-20dBc limit used: Worst case : Middle channel, limit at -29.26 dBm

NOTE:

1. Average value = Peak value + 20 Log (duty cycle) = Peak value – 30.1dB.
2. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correction factor be equal to: $20\log(3.125/100) = -30.1 \text{ dB}$.

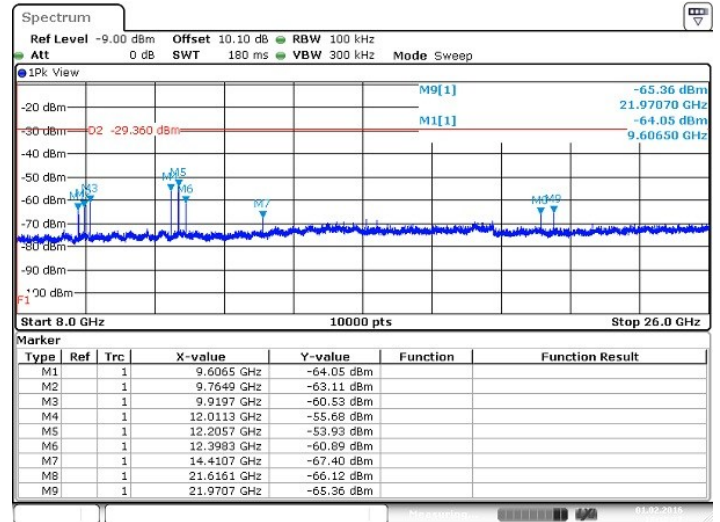
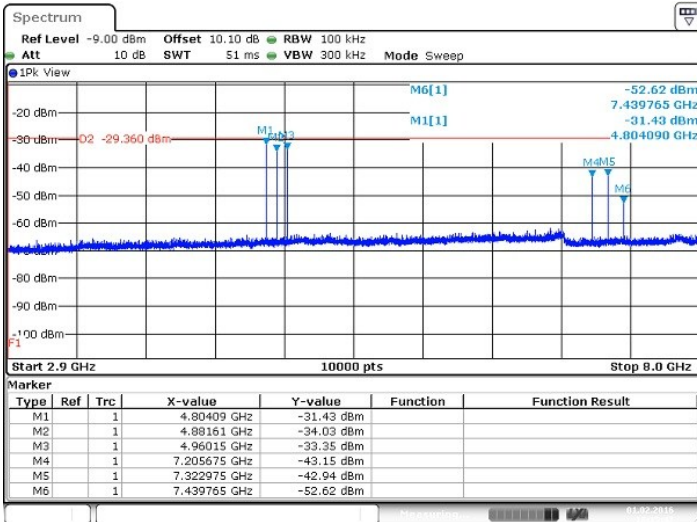
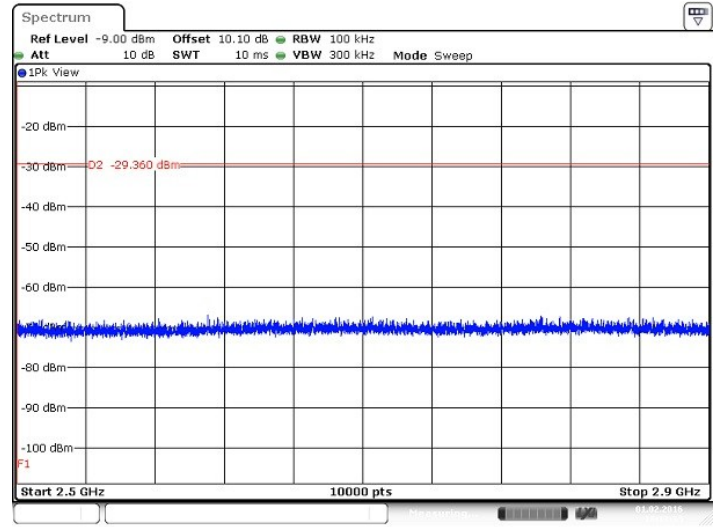
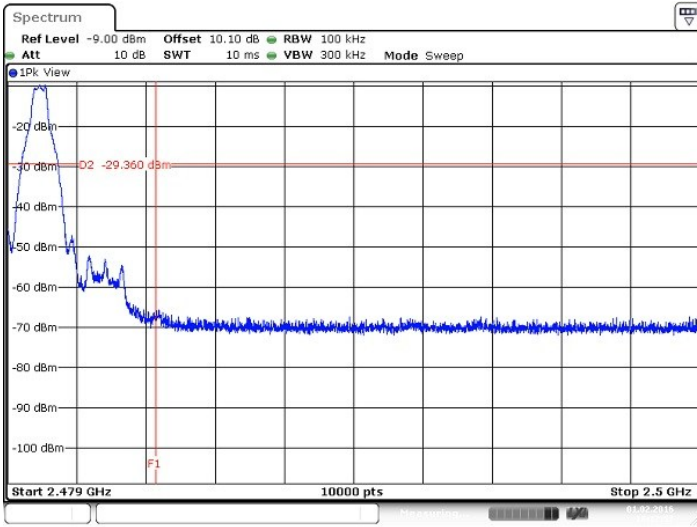


L C I E





L C I E



9.8. CONCLUSION

Band edge measurement performed on the sample of the product IMP300-MBCW2096, SN: 14225KT20007429, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



10. OCCUPIED BANDWIDTH

10.1. ENVIRONMENTAL CONDITIONS

Date of test : January 19, 2016
Test performed by : Jonathan PAUC
Atmospheric pressure (hPa) : 994
Relative humidity (%) : 24
Ambient temperature (°C) : 21

10.2. EQUIPMENT CONFIGURATION

Packet type: DH5
Hopping sequence: ON OFF

10.3. SETUP

Conducted measurement:

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Offset: Attenuator+cable 10.3dB

Radiated measurement:

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Measurement Procedure:

1. RBW used should not be lower than 1% of the selected span
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. OBW 99% function of spectrum analyzer used

10.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122206	03/15	03/16
Cable SMA	-	-	A5329705	12/15	12/16
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16
Bluetooth tester	ROHDE & SCHWARZ	CBT	A2440007	-	-

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

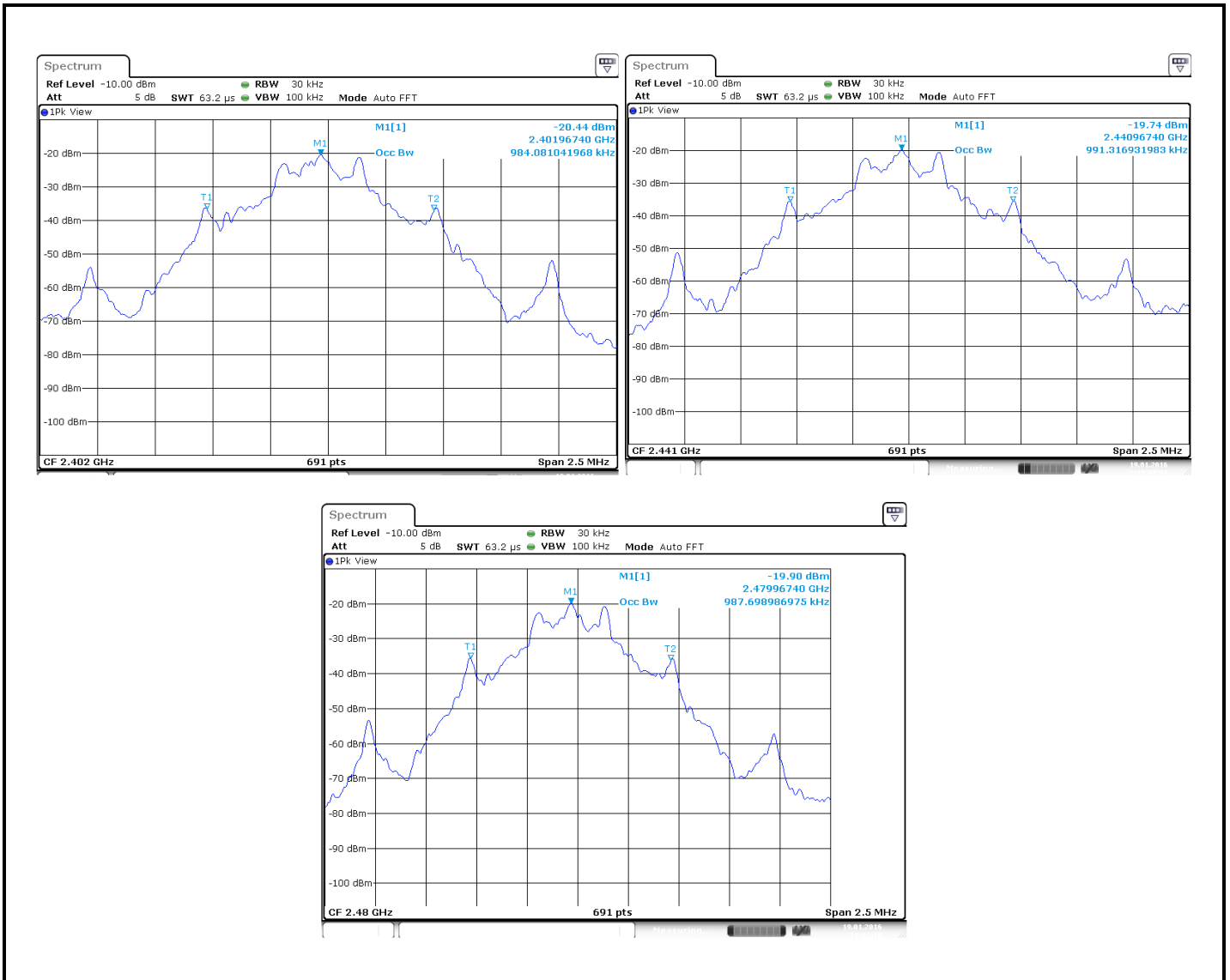
None Divergence:



L C I E

10.6. TEST SEQUENCE AND RESULTS

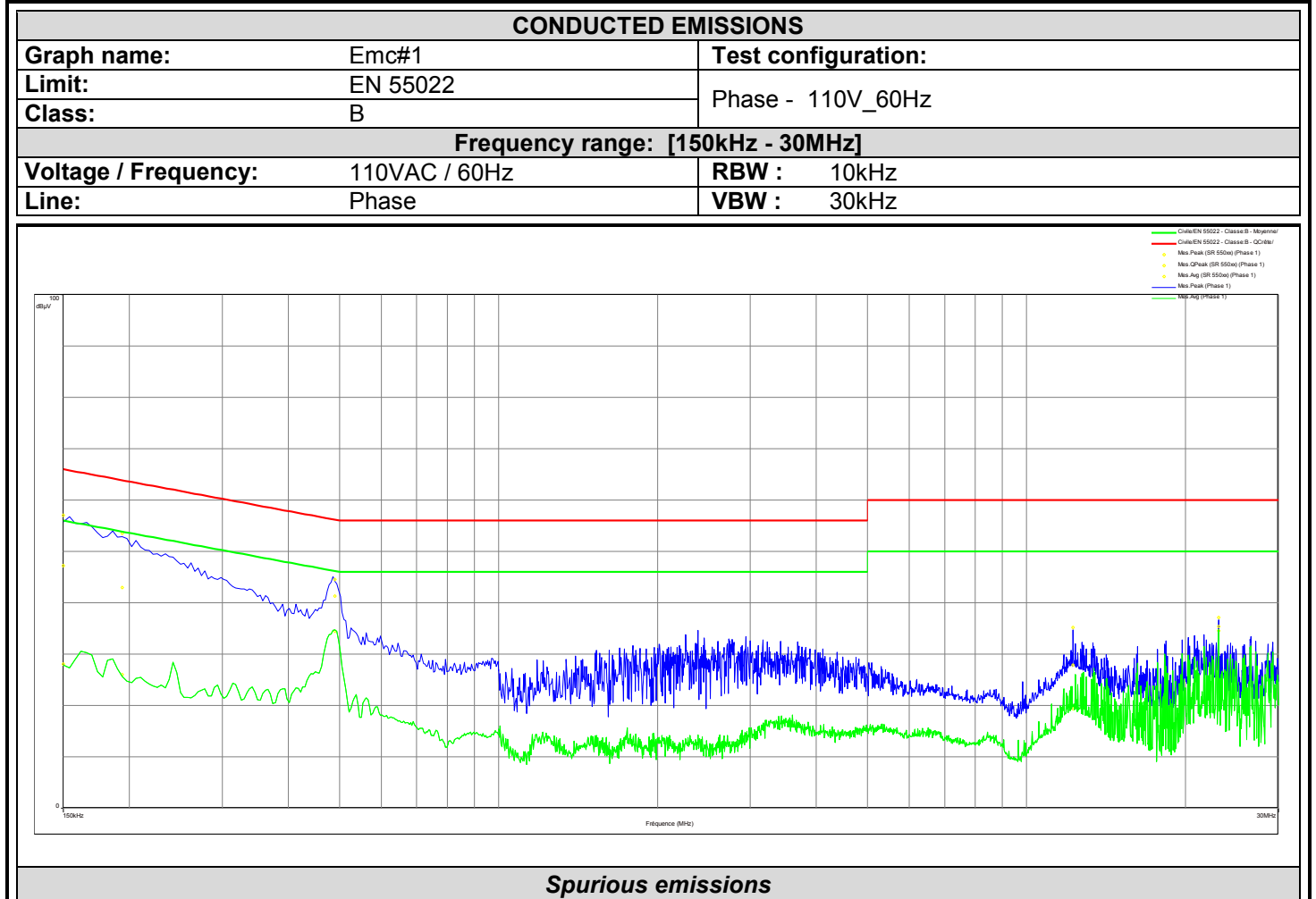
Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)
0	2402	0.984
39	2441	0.992
(78)	2480	0.988





L C I E

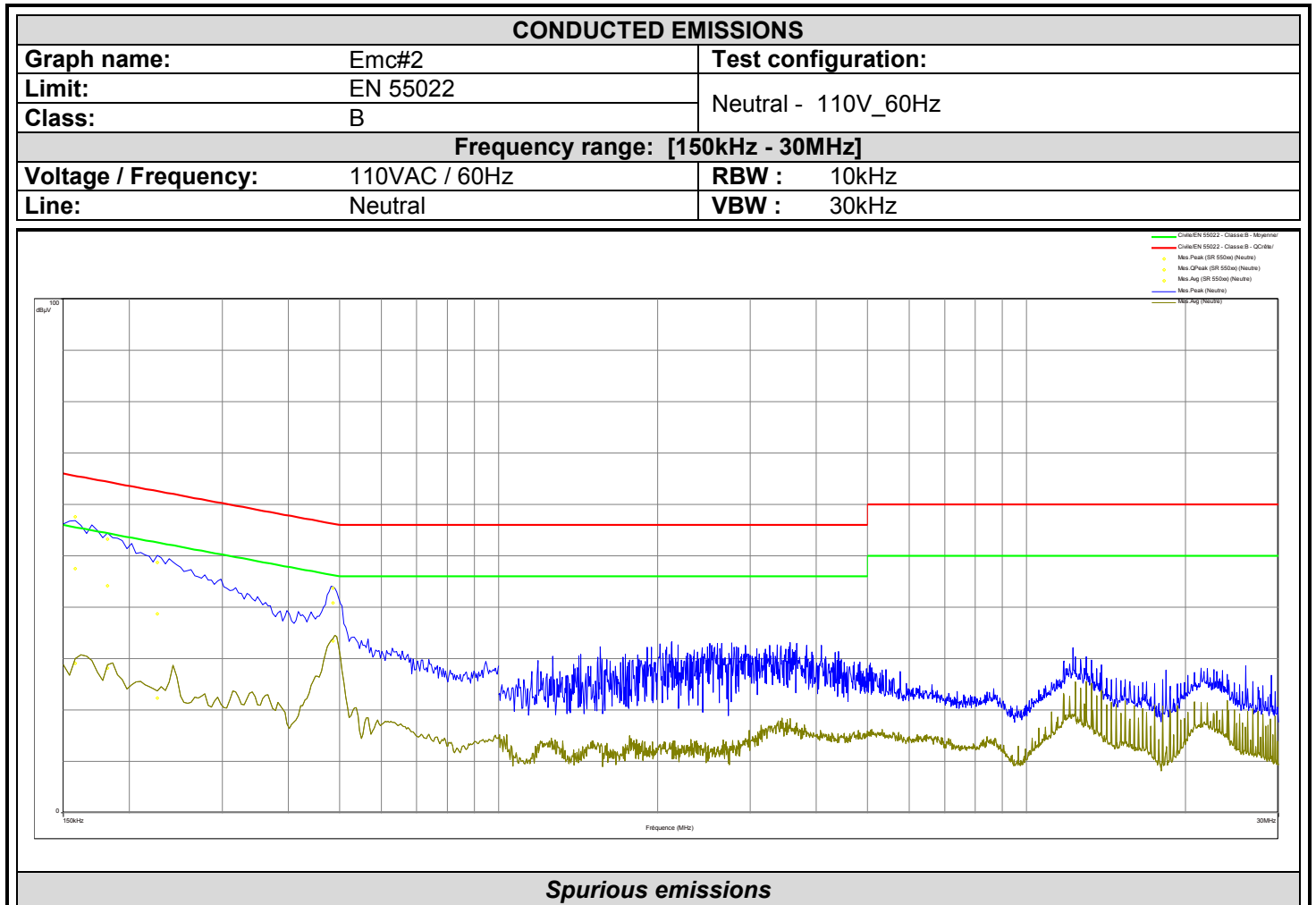
11. ANNEX 1 (GRAPHS)



Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line
0.150	57.0	47.3	65.2	-17.9	28.0	55.2	-27.1	Phase 1
0.192	53.5	42.9	62.0	-19.1	26.0	52.0	-26.0	Phase 1
0.491	44.5	41.3	56.2	-14.9	34.5	46.2	-11.8	Phase 1
12.240	35.2	27.8	60.0	-32.2	19.4	50.0	-30.6	Phase 1
23.128	37.2	35.4	60.0	-24.6	34.6	50.0	-15.4	Phase 1



L C I E



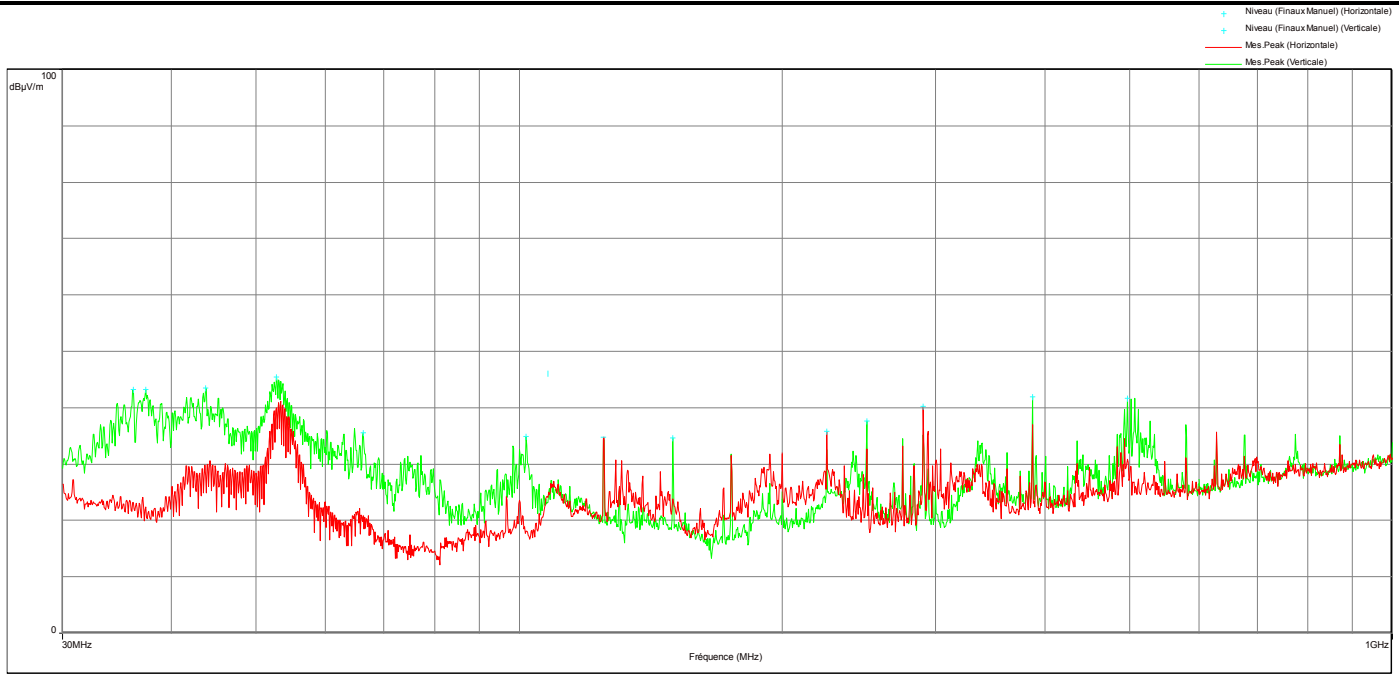
Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line
0.158	57.6	47.5	65.6	-18.1	29.1	55.6	-26.5	Neutre
0.182	53.3	44.2	64.4	-20.2	28.2	54.4	-26.2	Neutre
0.226	48.7	38.7	62.6	-23.8	22.3	52.6	-30.3	Neutre
0.486	43.8	40.8	56.2	-15.4	33.5	46.2	-12.8	Neutre



L C I E

RADIATED EMISSIONS

Graph name:	Emr#1	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - charging mode - Axis XY
Class:		
Frequency range: [30MHz - 1GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
124.996	34.8	Horizontale
224.960	35.8	Horizontale
290.280	40.2	Horizontale
36.137	43.2	Verticale
37.361	43.2	Verticale
43.787	43.5	Verticale
52.746	45.4	Verticale
66.261	35.6	Verticale
101.893	34.8	Verticale
150.003	34.7	Verticale
249.960	37.7	Verticale
387.040	41.9	Verticale
497.360	41.7	Verticale

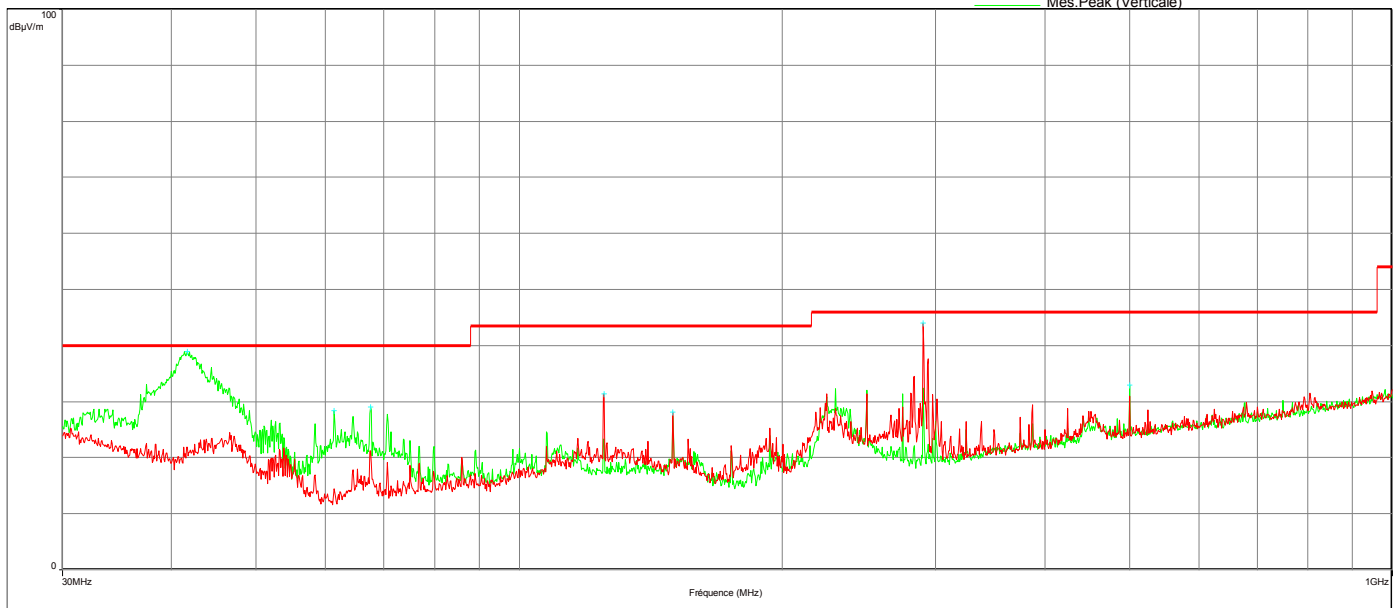


L C I E

RADIATED EMISSIONS

Graph name:	Emr#2	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMin - TX mode - Axis XY (done)
Class:		
Frequency range: [30MHz - 1GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
125.013	31.4	Horizontale
150.020	28.1	Horizontale
290.320	44.0	Horizontale
41.696	38.9	Verticale
61.399	28.4	Verticale
67.570	29.1	Verticale
500.040	33.0	Verticale

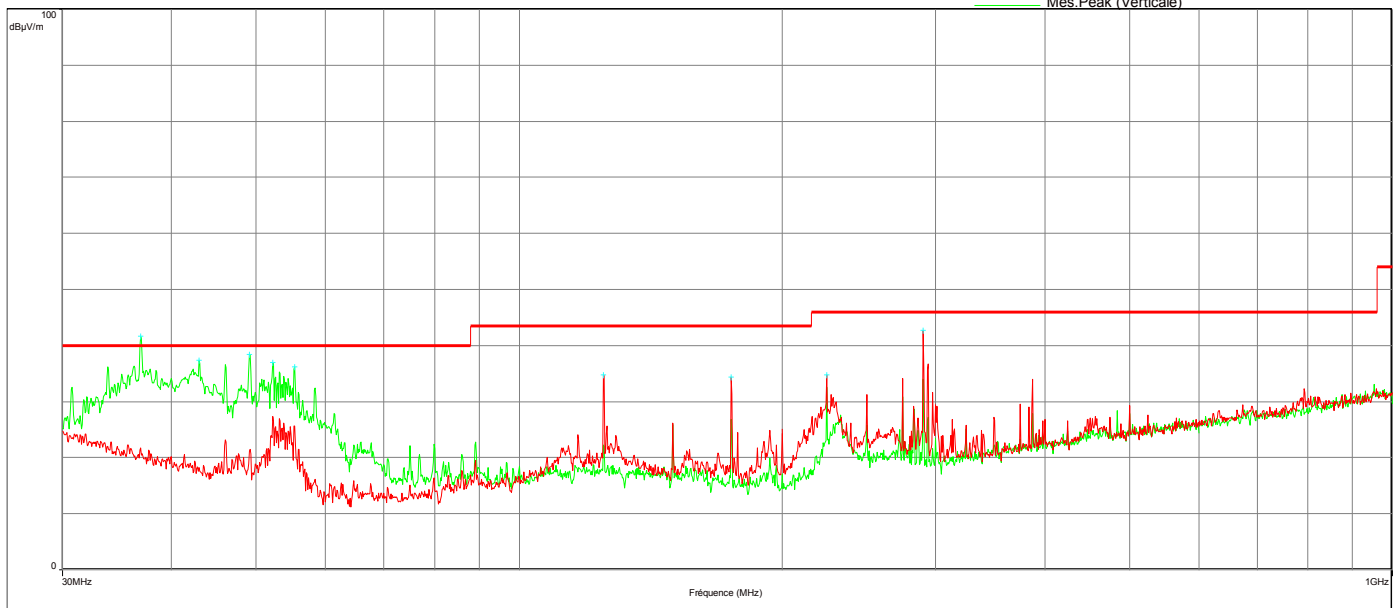


L C I E

RADIATED EMISSIONS

Graph name:	Emr#3	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY (done)
Class:		
Frequency range: [30MHz - 1GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
124.996	34.8	Horizontale
175.010	34.4	Horizontale
225.000	34.7	Horizontale
290.280	42.7	Horizontale
36.868	41.7	Verticale
43.022	37.4	Verticale
49.142	38.4	Verticale
52.236	37.0	Verticale
55.296	36.3	Verticale

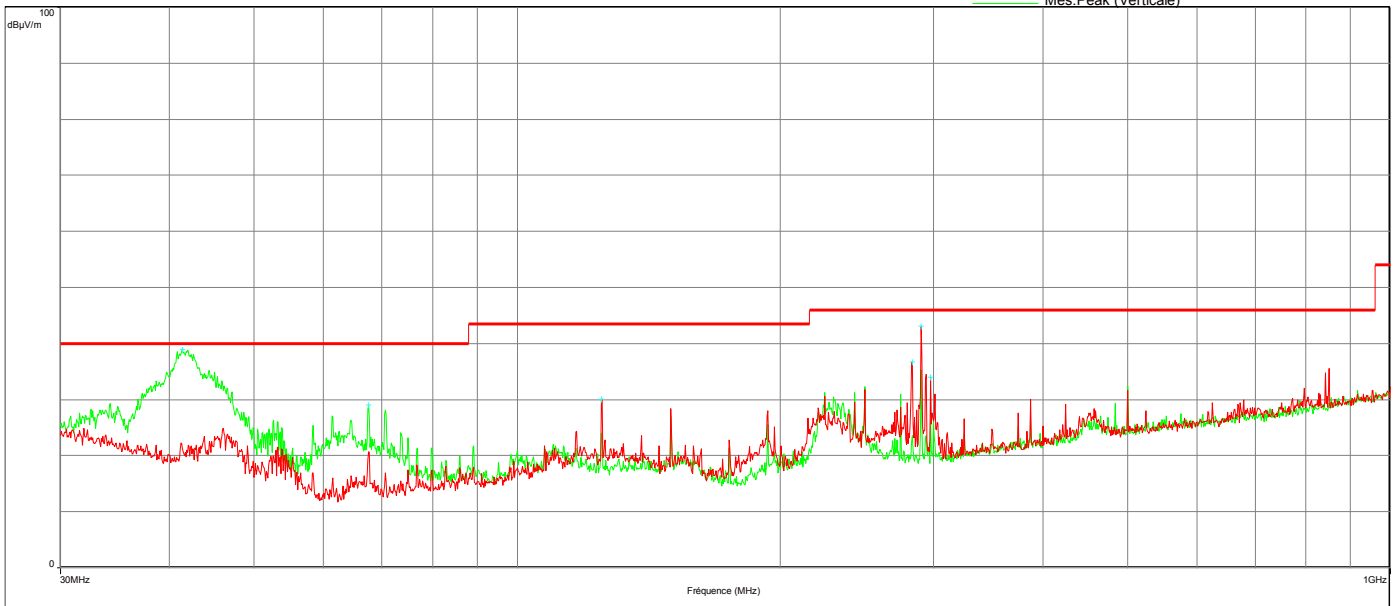


L C I E

RADIATED EMISSIONS

Graph name:	Emr#4	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis XY (done)
Class:		
Frequency range: [30MHz - 1GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

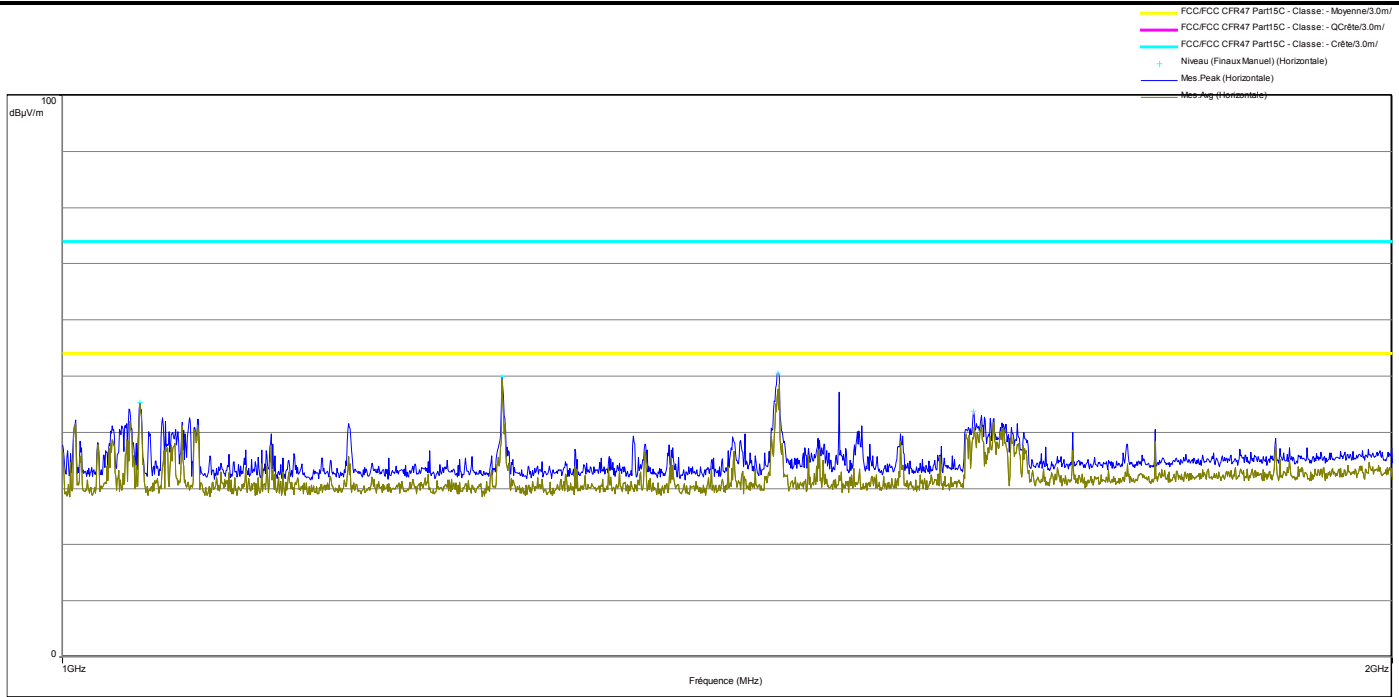
Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
124.996	30.1	Horizontale
283.240	36.8	Horizontale
290.240	43.2	Horizontale
297.320	34.0	Horizontale
41.339	39.0	Verticale
67.553	29.1	Verticale



L C I E

RADIATED EMISSIONS

Graph name:	Emr#5	Test configuration:
Limit:	FCC CFR47 Part15C	(H) - charging mode - Axis XY
Class:		
Frequency range: [1GHz - 2GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 1MHz
Azimuth:	0° - 360°	VBW : 3MHz



Spurious emissions

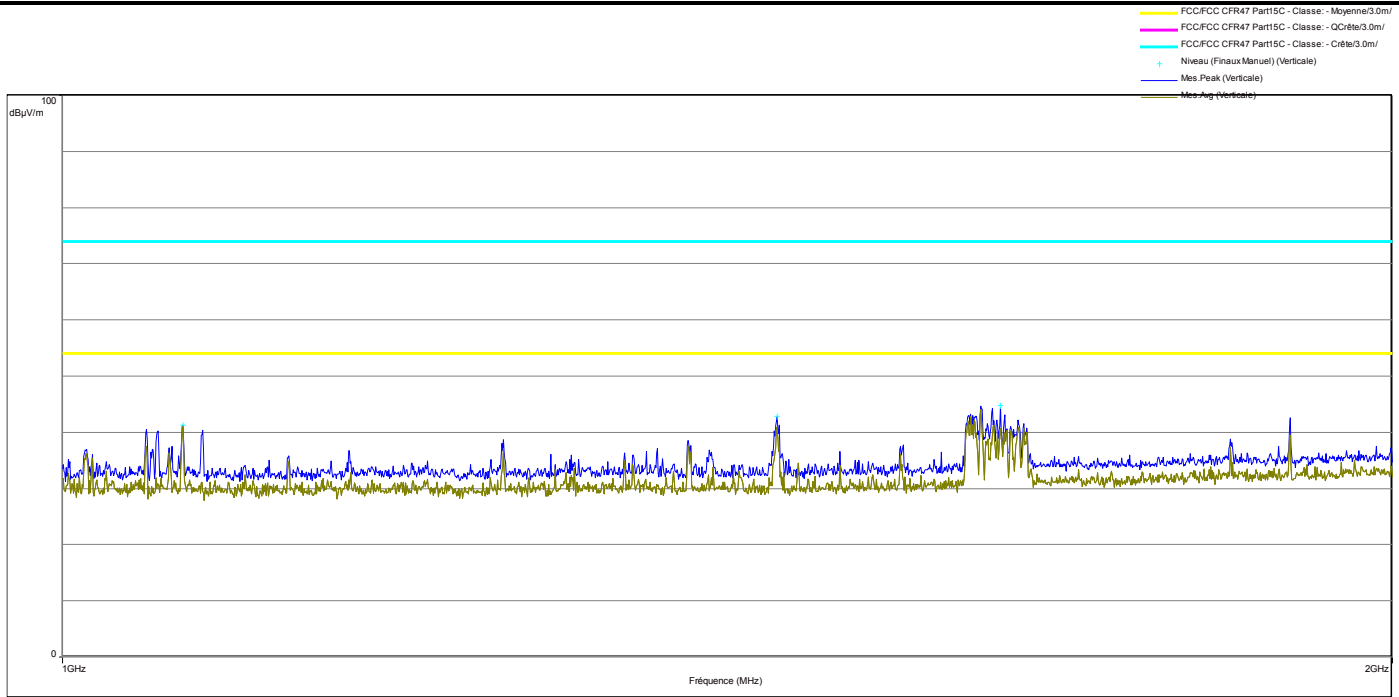
Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
1041.200	45.3	Horizontale
1257.400	49.9	Horizontale
1451.700	50.6	Horizontale
1607.800	43.7	Horizontale



L C I E

RADIATED EMISSIONS

Graph name:	Emr#6	Test configuration:
Limit:	FCC CFR47 Part15C	(V) - charging mode - Axis XY
Class:		
Frequency range: [1GHz - 2GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 1MHz
Azimuth:	0° - 360°	VBW : 3MHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
1064.700	41.3	Verticale
1451.400	42.9	Verticale
1630.300	44.8	Verticale

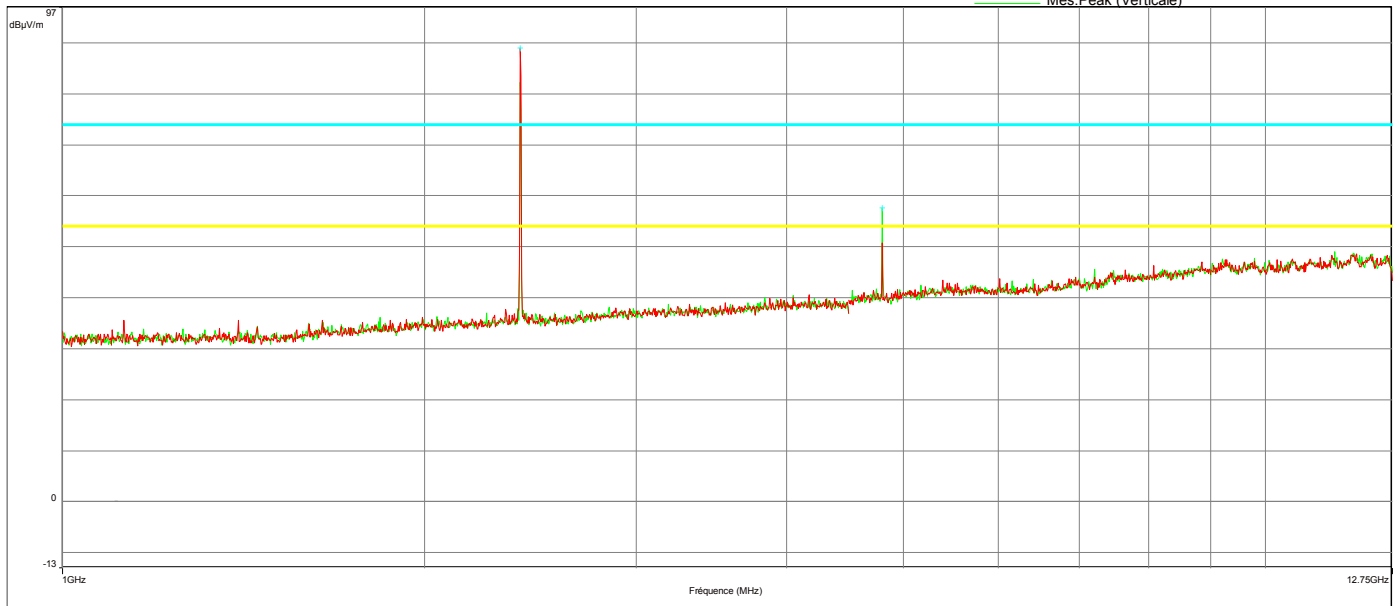


L C I E

RADIATED EMISSIONS

Graph name:	Emr#7	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMin - TX mode - Axis XY (done) B2
Class:		
Frequency range: [1GHz - 12.75GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 1MHz
Azimuth:	0° - 360°	VBW : 3MHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
2402.100	89.1	Horizontale
4804.200	57.6	Verticale

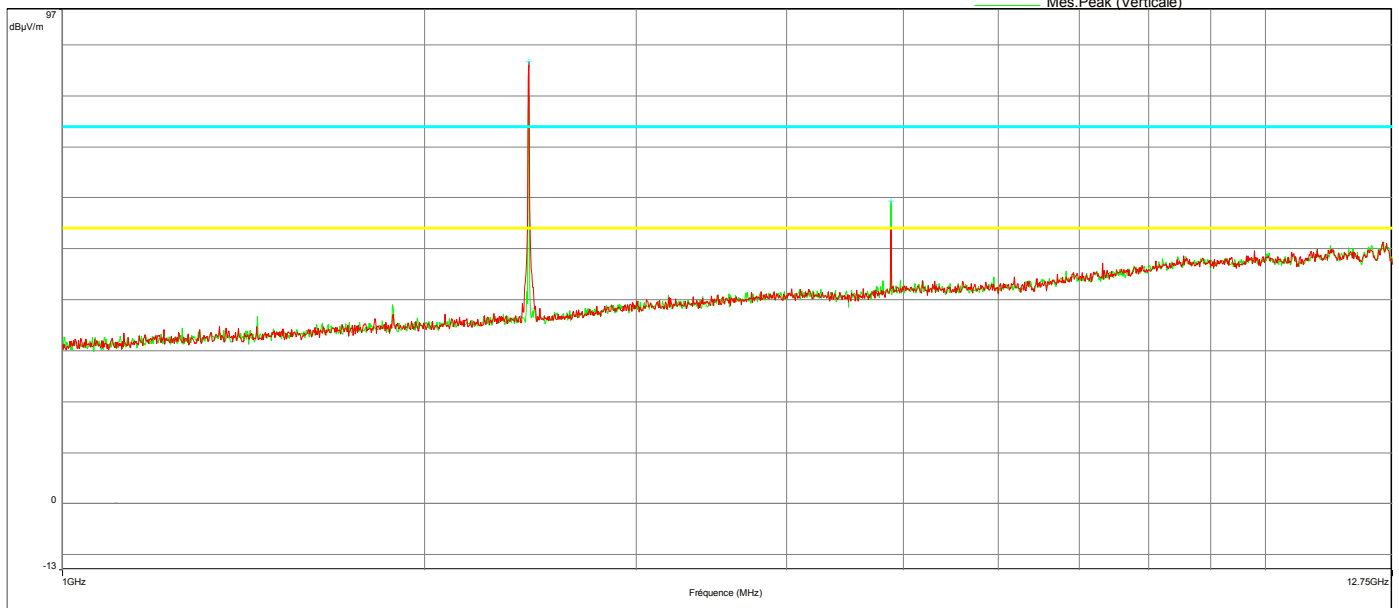


L C I E

RADIATED EMISSIONS

Graph name:	Emr#8	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY B2
Class:		
Frequency range: [1GHz - 12.75GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 1MHz
Azimuth:	0° - 360°	VBW : 3MHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
2440.950	86.6	Horizontale
4881.600	59.4	Verticale

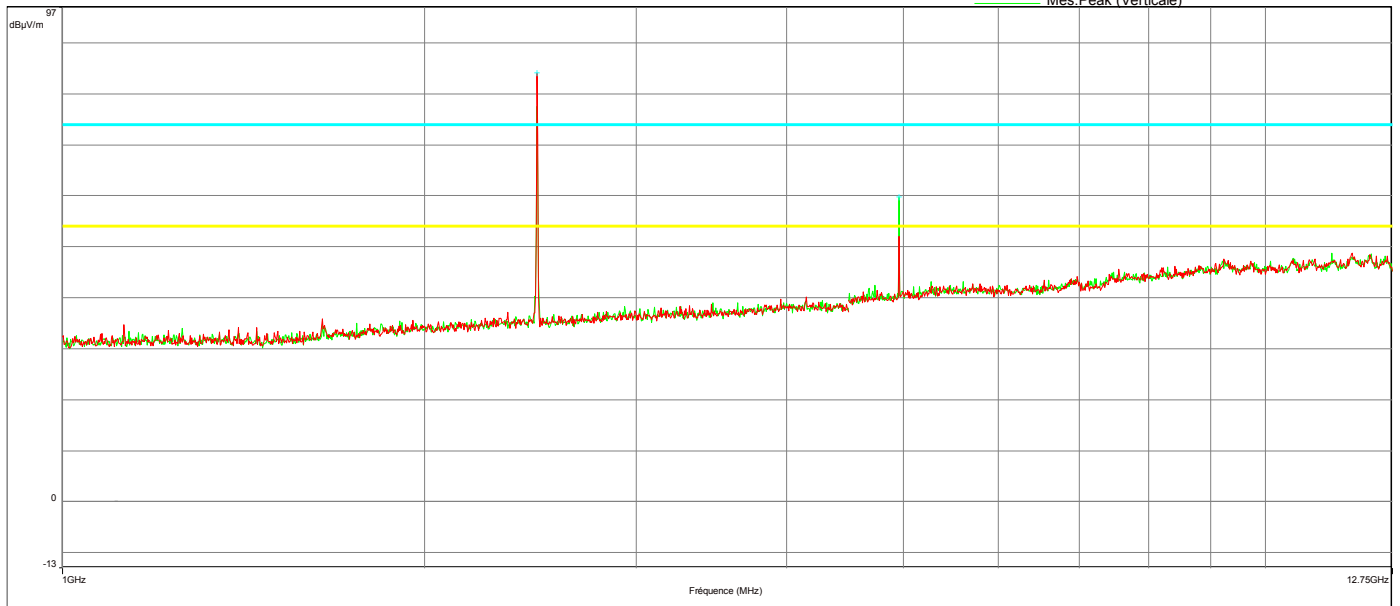


L C I E

RADIATED EMISSIONS

Graph name:	Emr#9	Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis XY (done) B2
Class:		
Frequency range: [1GHz - 12.75GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 1MHz
Azimuth:	0° - 360°	VBW : 3MHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- + Niveau (Finaux Manuel) (Horizontale)
- + Niveau (Finaux Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Polarisation
2480.150	84.2	Horizontale
4959.900	59.8	Verticale



12. UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) ± x	Incertitude limite du CISPR / CISPR uncertainty limit ± y
Mesure des perturbations conduites en tension sur le réseau d'énergie <i>Measurement of conducted disturbances in voltage on the power port</i>	3.57 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication <i>Measurement of conducted disturbances in voltage on the telecommunication port.</i>	3.28 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension <i>Measurement of discontinuous conducted disturbances in voltage</i>	3.47 dB	3.6 dB
Mesure des perturbations conduites en courant <i>Measurement of conducted disturbances in current</i>	2.90 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Moirans <i>Measurement of radiated electric field on the Moirans open area test site</i>	5.07 dB	5.2 dB

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.