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Test Report for FCC

FCC ID :X59-BA-400

Report Number		ESTRFC1802-001		
Applicant	Company name	H3 SYSTEM Co., Ltd.		
	Address	1F, 283, Baeul 1-ro, Yuseong-gu, Daejeon, Korea		
	Telephone	+82-42-862-9314		
	Contack person	Sung-Dae Lim		
Product	Product name	Bluetooth Adapter		
	Model No.	BA-400	Manufacturer	H3 SYSTEM Co., Ltd.
	Serial No.	None	Country of origin	KOREA
Test date	20-Dec-17 ~ 17-Jan-18		Date of issue	8-Feb-18
Testing location	347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do 467-811, R. O. Korea			
Standard	FCC PART 15 Subpart C (15.247), ANSI C 63.10(2013)			
Measurement facility registration number	659627			
Tested by	Senior Engineer I.K. Hong	(Signature)		
Reviewed by	Engineering Manager K.B. Lee	(Signature)		
Abbreviation				

* Note

- This test report is not permitted to copy partly without our permission
- This test result is dependent on only equipment to be used
- This test result based on a single evaluation of one sample of the above mentioned

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Contents

1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.
ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.
ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC/Telecom/Safety Test Lab : 140-16, Eongmalli-ro, Majang-myeon, Icheon-si,
Gyeonggi-do 467-811, R. O. Korea

1.3 Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication
KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements
FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC
VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Modulation Type	: Bluetooth (GFSK)
Transfer Rate	: 1 Mbps
Number of Channel	: 40 ch
PEAK Output Power	: GFSK : 0.060 mW
Rating	: DC 3.0 V (Coin cell Battery x 1EA)
Receipt Date	: 1-Jun-17
X-tal list(s) or Frequencies generated	: The highest operating frequency is 2480 MHz(Bluetooth) Blutooth : 2.4 GHz

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.10 (2009) & KDB558074 D01(2015)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain decides that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment These method apply to the measurement of individual units or systems comprised of multiple units

Summary of Test Results

Applied Satandard : 47 CFR Part 15 Subpart C				remark
Standard	Test Type	Result	Remark	Limit
15.207	AC Power Conducted Emission	N/A		
15.205 & 15.209	Restricted band / Intentional Radiated Emission	Pass	Meet the requirement	
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement	Min. 500 kHz
	Occupied Bandwidth			
15.247(b)(3)	Maximum Peak/average ouput power	Pass	Meet the requirement	Max. 30 dBm
15.247(c)	Transmitter Radiated Emission	Pass	Meet the requirement	Table 15.209
15.247(e)	Power Spectral Density	Pass	Meet the requirement	Max. 8 dBm
15.247(d)	Band Edge Measurement	Pass	Meet the requirement	20 dB less

4. Measurement Condition

4.1 EUT Operation

a. Channel

Ch.	Frequency	Ch.	Frequency
0	2402 MHz	21	2444 MHz
1	2404 MHz	22	2446 MHz
2	2406 MHz	23	2448 MHz
3	2408 MHz	24	2450 MHz
4	2410 MHz	25	2452 MHz
5	2412 MHz	26	2454 MHz
6	2414 MHz	…	…
…	…	39	2480 MHz
20	2442 MHz		

b. Measurement Channel : Bluetooth : Low(2402 MHz), Middle(2442 MHz), High(2480 MHz)

c. Test Mode : Continuous Output, GFSK

d. Test rate : 1 Mbps

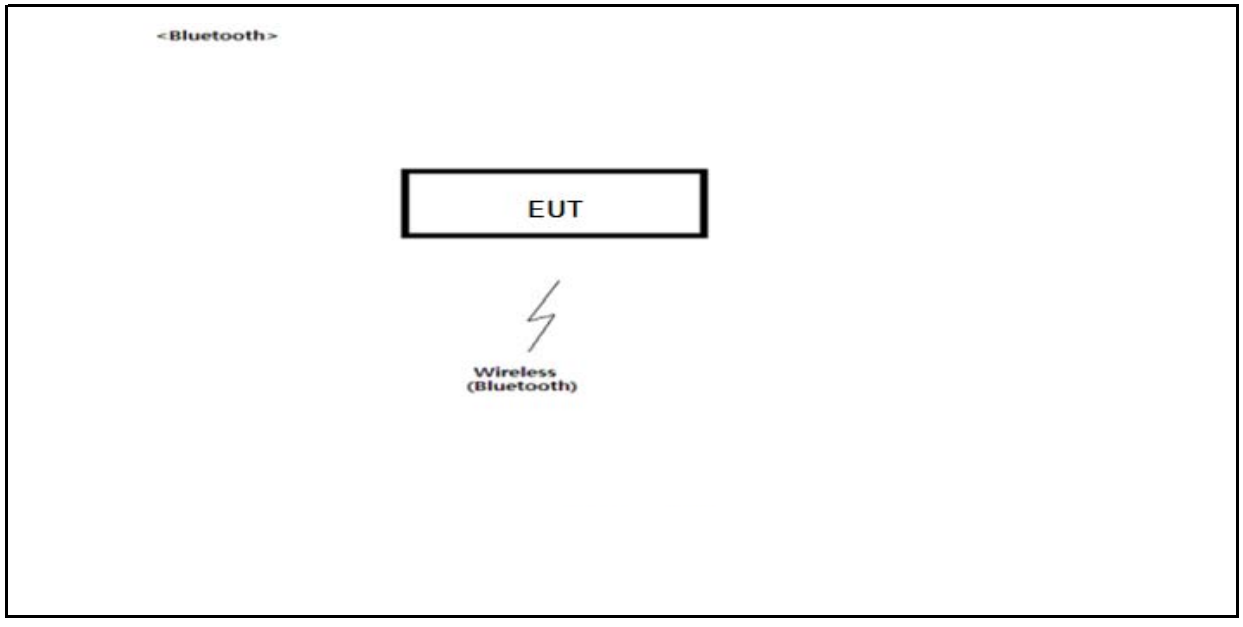
4.2 EUT Operation.

- The EUT was in the following operation mode during all testing

* Bluetooth operation check

* Transmit mode were measured each channels(Low, Middle, High)

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Bluetooth Adapter	BA-400	NONE	H3 SYSTEM Co., Ltd.	EUT

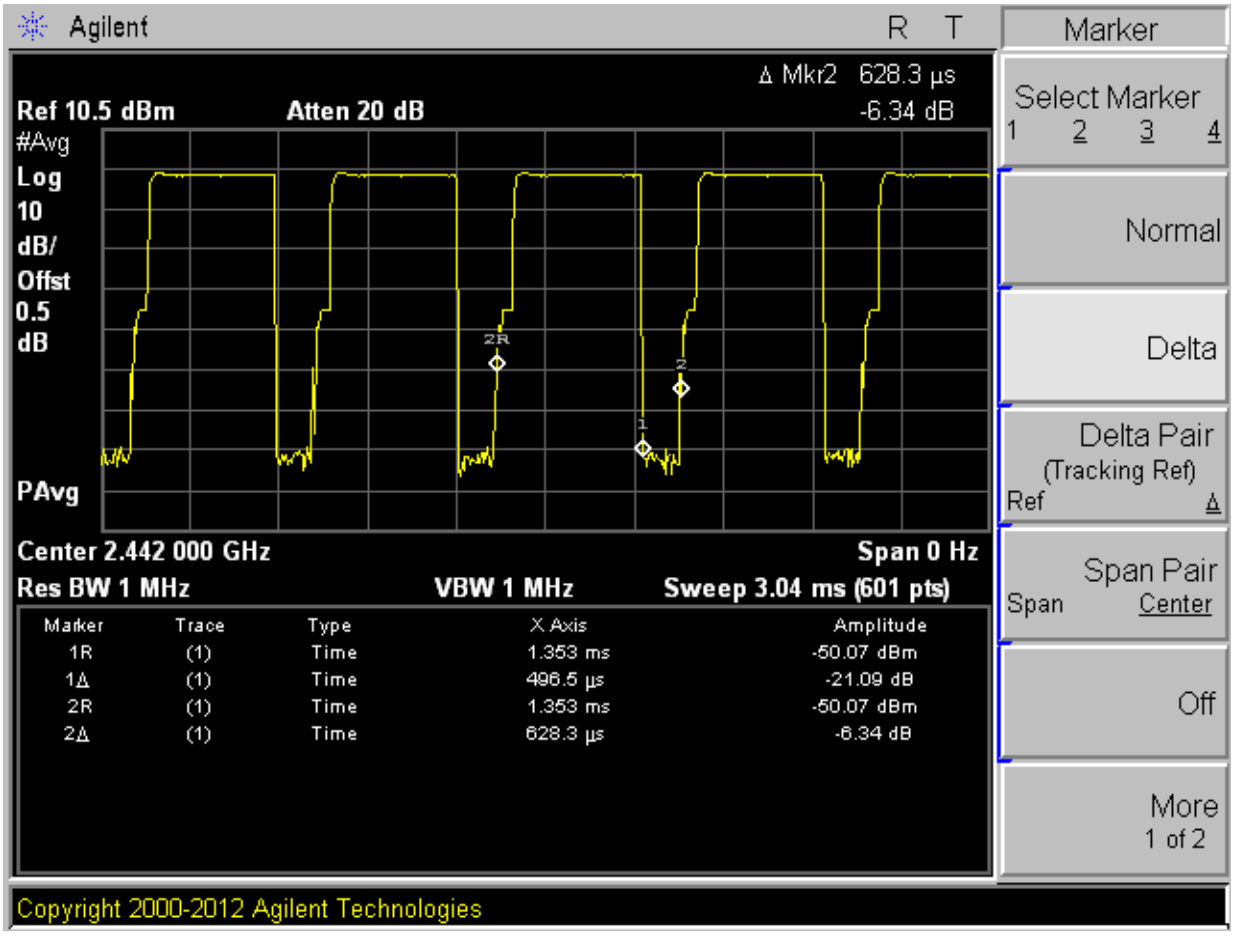
4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Bluetooth Adapter	Wireless (Bluetooth)	-	-	-	-	

4.6 DUTY CYCLE OF TEST SIGNAL

Duty cycle is < 98%, duty factor shall be considered.

duty cycle = 0.496/0.628=0.790, duty factor = 10*log(1/0.790)=1.020



5. DTS bandwidth

5.1 Test procedure

558074 D01 DTS Meas Guidance v03r05 Option 2

5.2 Test instruments and measurement setup

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 X RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

Limits : FCC § 15.247(a)(2)

6dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	27-Dec-18
RF Cable	Length: 30 cm	-	
-Spectrum Analyzer <=> EUT	Loss: 0.5 dB	-	

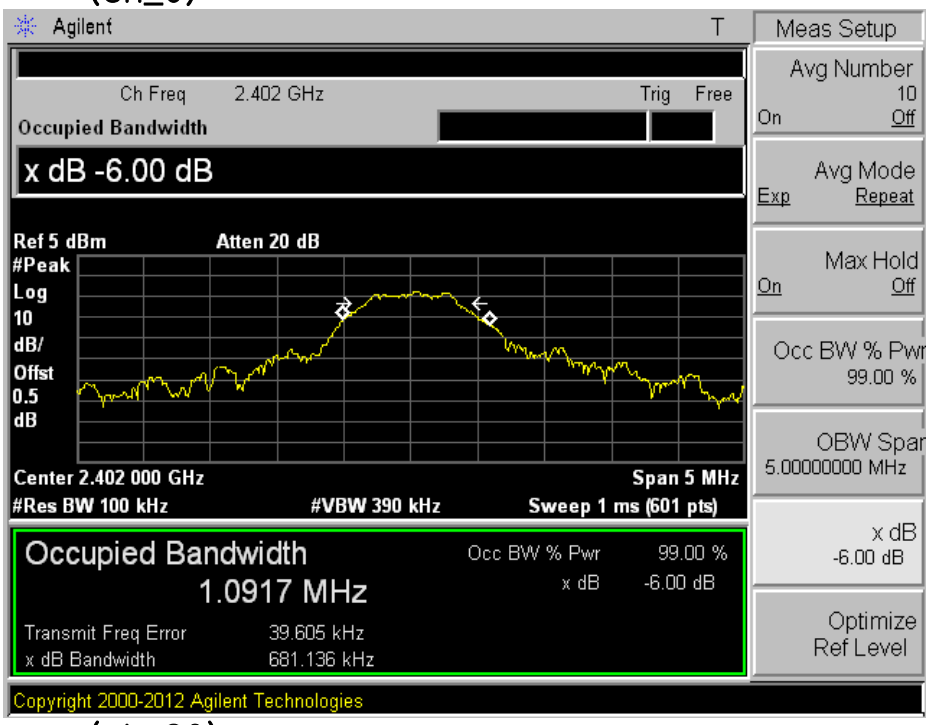
5.3 Measurement results

EUT	Bluetooth Adapter	MODEL	BA-400
MODE	GFSK	ENVIRONMENTAL CONDITION	22.0 ℃, 47.0 % R.H.
INPUT POWER	3.0 Vd.c.		

Channel Frequency (MHz)	Occupied Bandwidth(MHz)	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2402	1.09	0.68	0.5	PASS
2442	1.07	0.69	0.5	PASS
2480	1.05	0.68	0.5	PASS

5.4 Trace data

(ch_0)



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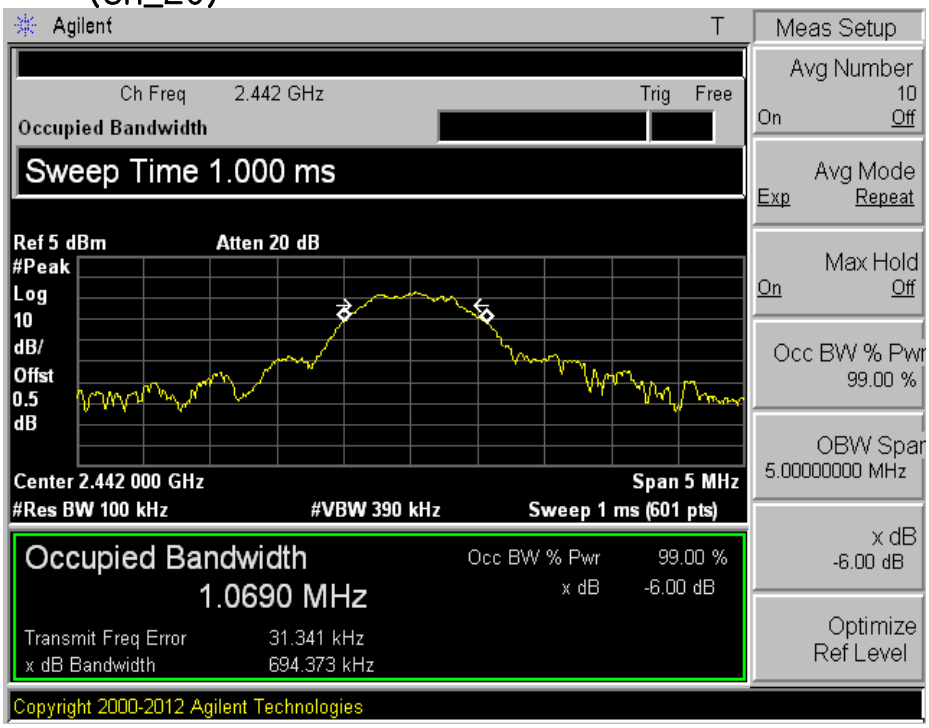

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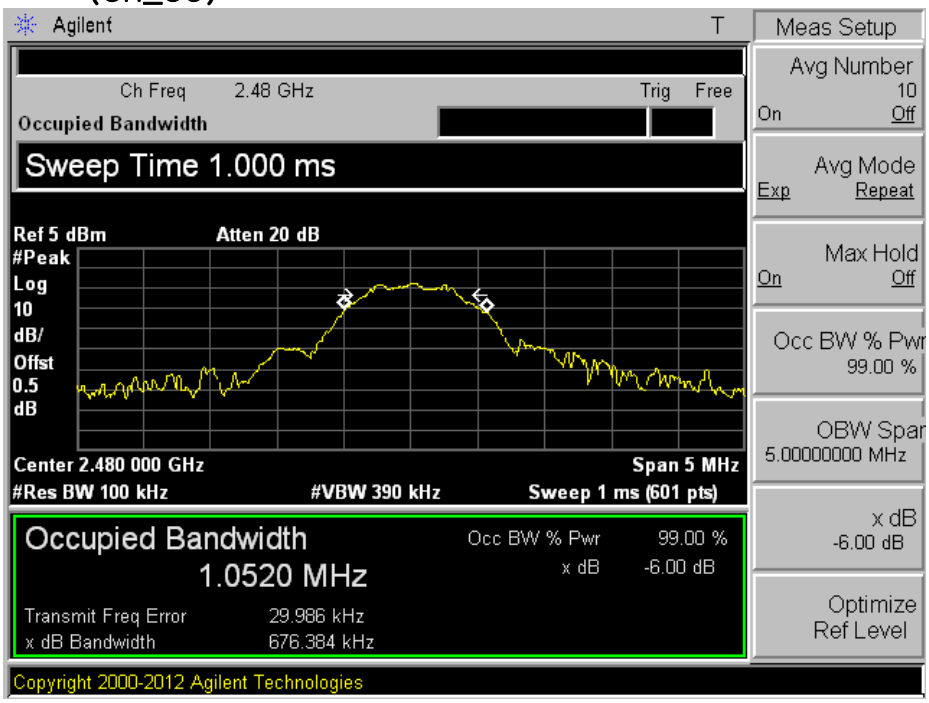
Agilent
T
Meas Setup
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Sweep Time 1.000 ms
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
5.00000000 MHz
x dB
-6.00 dB
Optimize
Ref Level
Ref 5 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.480 000 GHz
Span 5 MHz
#Res BW 100 kHz
#VBW 390 kHz
Sweep 1 ms (601 pts)
Occupied Bandwidth
1.0520 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error 29.986 kHz
x dB Bandwidth 676.384 kHz
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6. Maximum peak conducted output power

6.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r05 9.1.1 Integrated band power method

6.2 Test instruments and measurement setup

a) Set the RBW ≥ DTS.
b) Set VBW ≥ 3 × RBW.
c) Set span ≥ 3 x RBW
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

Limits : FCC § 15.247

Maximum Peak Output Power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	27-Dec-18
RF Cable	Length: 30 cm	-	
-Spectrum Analyzer <=> EUT	Loss: 0.5 dB	-	

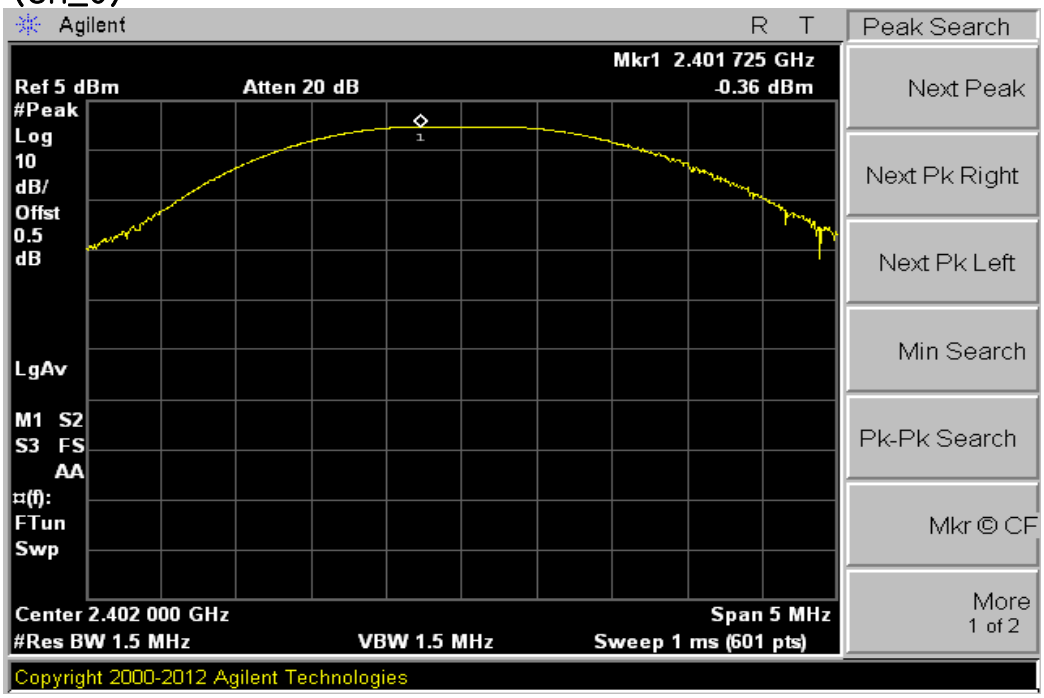
6.3 Measurement results

EUT	Bluetooth Adapter	MODEL	BA-400
MODE	GFSK	ENVIRONMENTAL CONDITION	22.0 ℃, 45.0 % R.H.
INPUT POWER	3.0 Vd.c.		

CHANNEL	Channel requency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(mW)		
0	2 402	PEAK	-0.36	0.920	30.0	PASS
20	2 442	PEAK	-0.58	0.875	30.0	PASS
39	2 480	PEAK	-0.71	0.849	30.0	PASS

6.4 Trace data

(ch_0)



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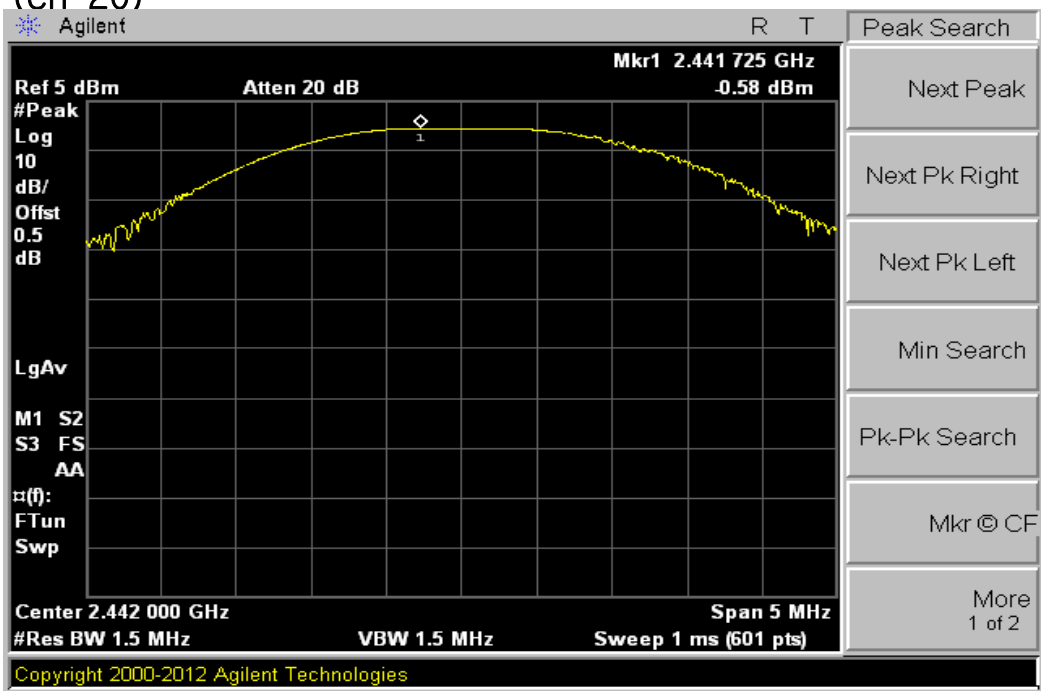

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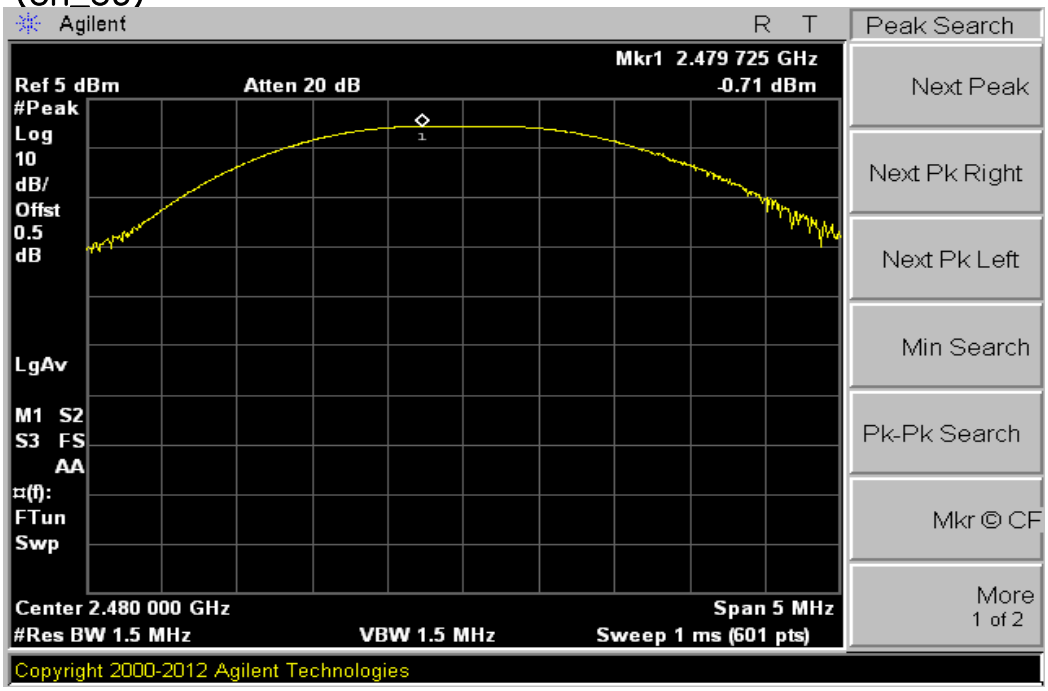
Agilent
R T
Peak Search
Mkr1 2.479 725 GHz
Ref 5 dBm
Atten 20 dB
-0.71 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 2.480 000 GHz
Span 5 MHz
#Res BW 1.5 MHz
VBW 1.5 MHz
Sweep 1 ms (601 pts)
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7. Maximum power spectral density level in the fundamental emission

7.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r05 10.2 Method PKPSD (peak PSD)

7.2 Test instruments and measurement setup

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to 1.5 times the DTS bandwidth.

c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

d) Set the VBW ≥ 3 x RBW

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Limits FCC § 15.247

The peak power density Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E440A	US42041291	27-Dec-18
RF Cable	Length: 30 cm	-	
-Spectrum Analyzer <=> EUT	Loss: 0.5 dB	-	

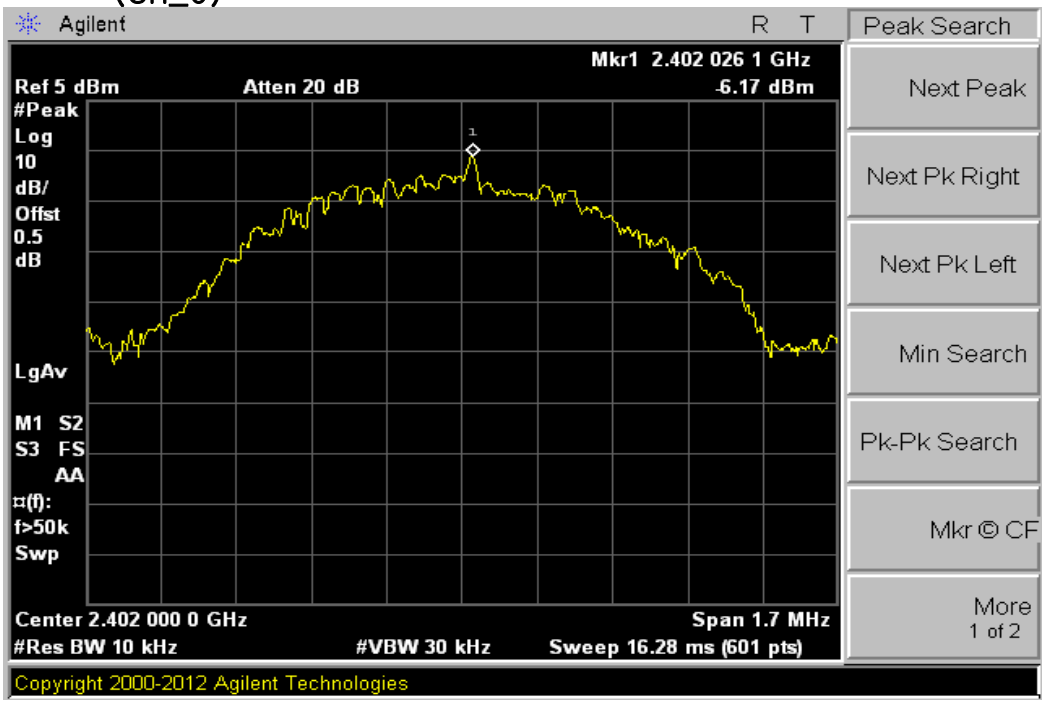
7.3 Measurement results

EUT	Bluetooth Adapter	MODEL	BA-400
MODE	GFSK	ENVIRONMENTAL CONDITION	21.0 ℃, 45.0 % R.H.
INPUT POWER	3.0 Vd.c.		

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
0	2 402	-6.17	8.0	14.17
20	2 442	-7.96	8.0	15.96
39	2 480	-6.18	8.0	14.18

7.4 Trace data

(ch_0)



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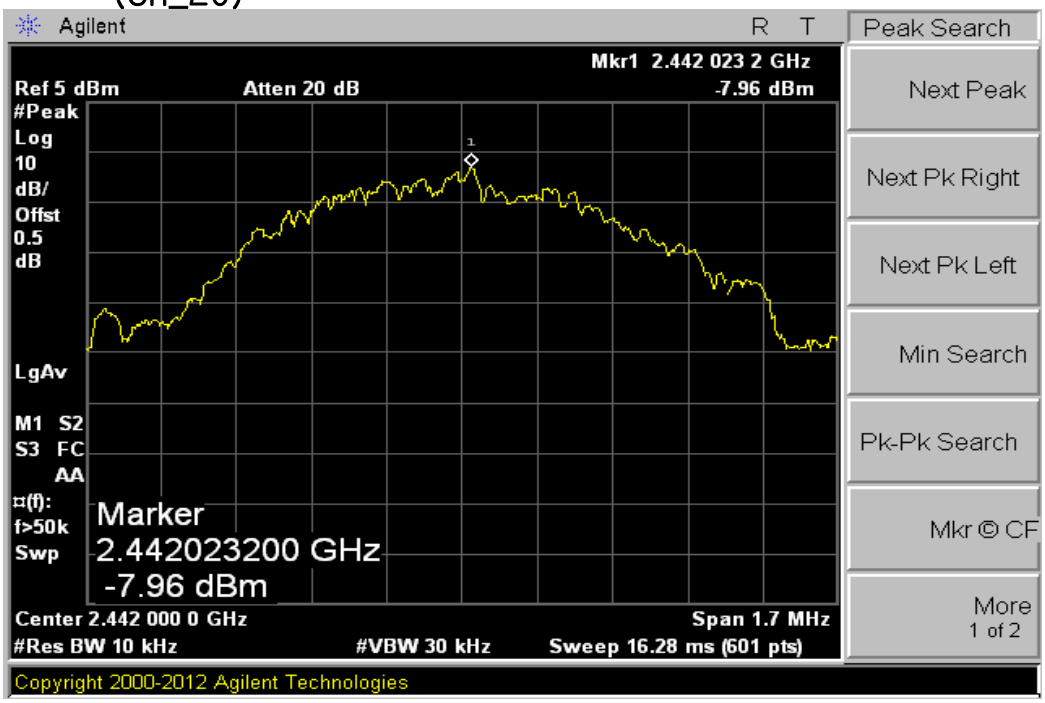
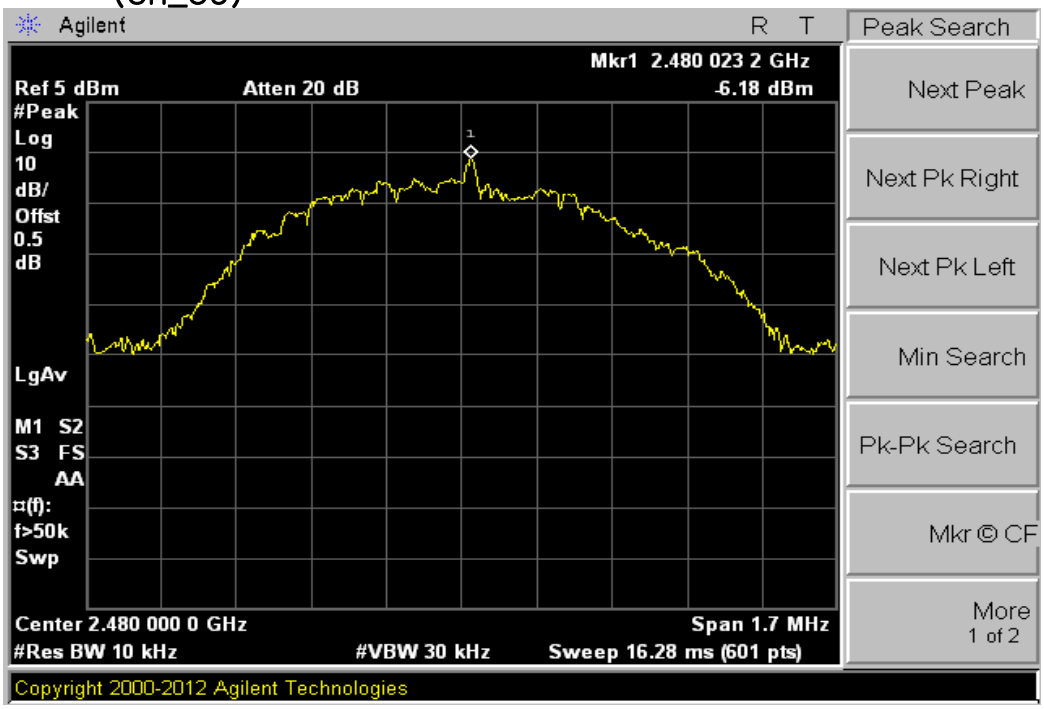


(ch_39)


Agilent
R T
Peak Search
Mkr1 2.480 023 2 GHz
Ref 5 dBm
Atten 20 dB
-6.18 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
LgAv
M1 S2
S3 FS
AA
¤(f):
f>50k
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 2.480 000 0 GHz
Span 1.7 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 16.28 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

8. Emissions in non-restricted frequency bands

8.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r05 11.0 Emissions in non-restricted frequency

8.2 Test instruments and measurement setup

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions(15.247(d))

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Limits FCC § 15.247

Band Edge&Out of Emission Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	27-Dec-18
RF Cable	Length: 30 cm		-
-Spectrum Analyzer <=> EUT	Loss: 0.5 dB		-

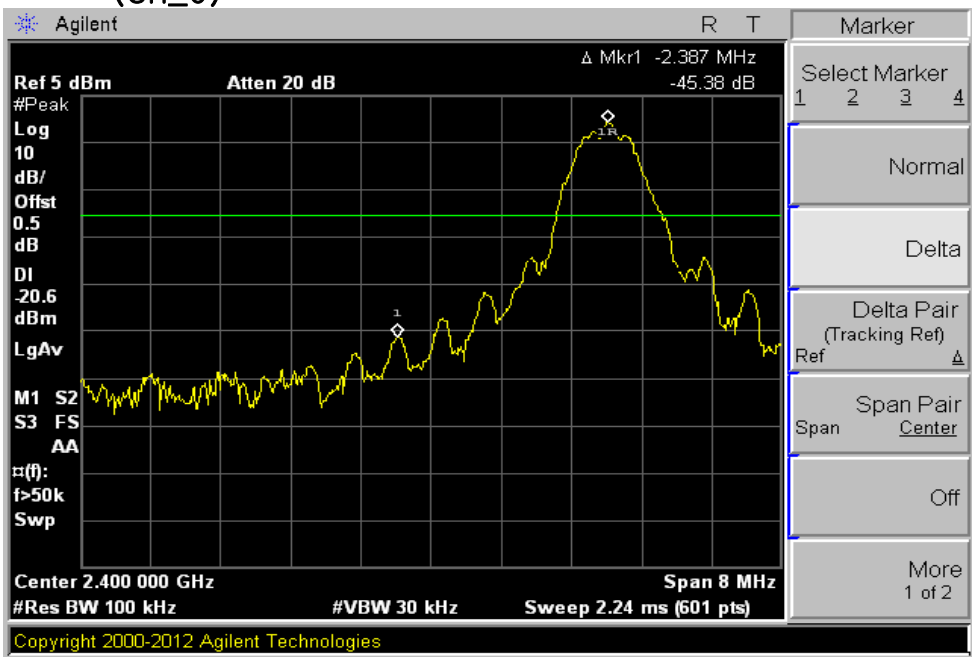
8.3 Measurement results of band-edge & out of emission

EUT	Bluetooth Adapter	MODEL	BA-400
MODE	GFSK	ENVIRONMENTAL CONDITION	21.0 ℃, 45.0 % R.H.
INPUT POWER	3.0 Vd.c.		

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
0	2 402	20dBc	PASS
39	2 480	20dBc	PASS

8.4 Trace data of band-edge & Out of Emission

(ch_0)



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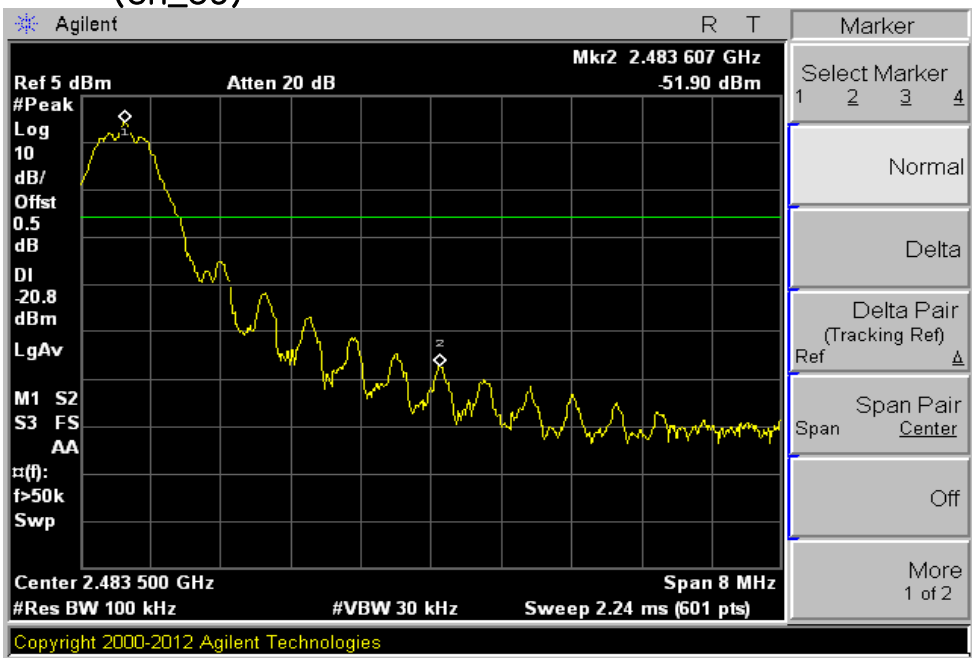
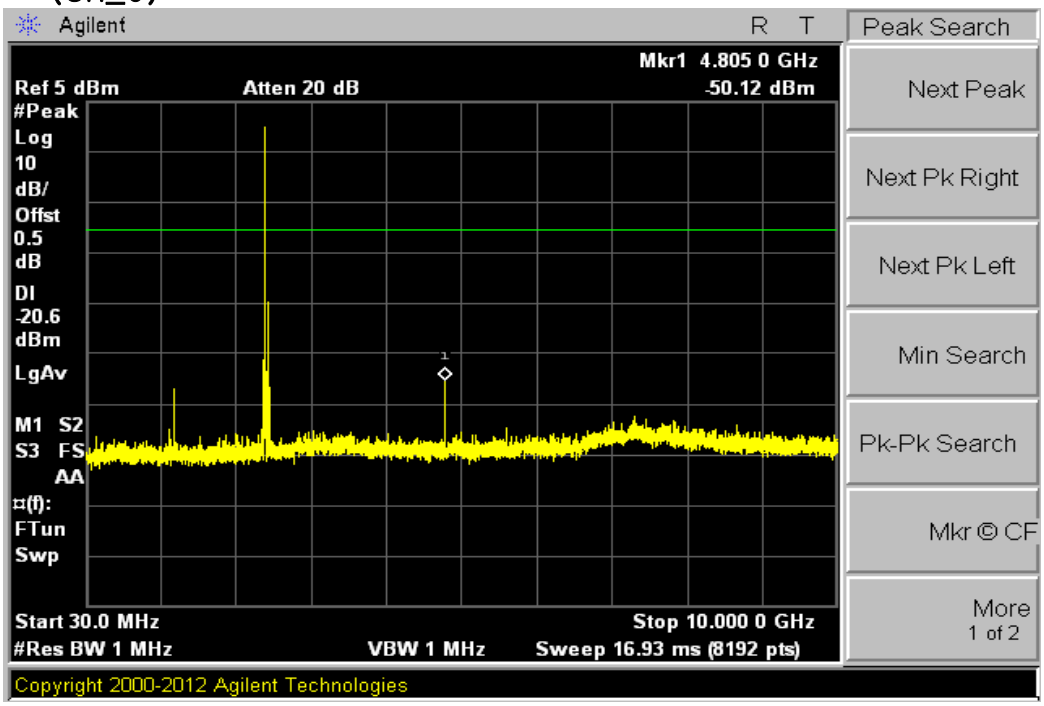
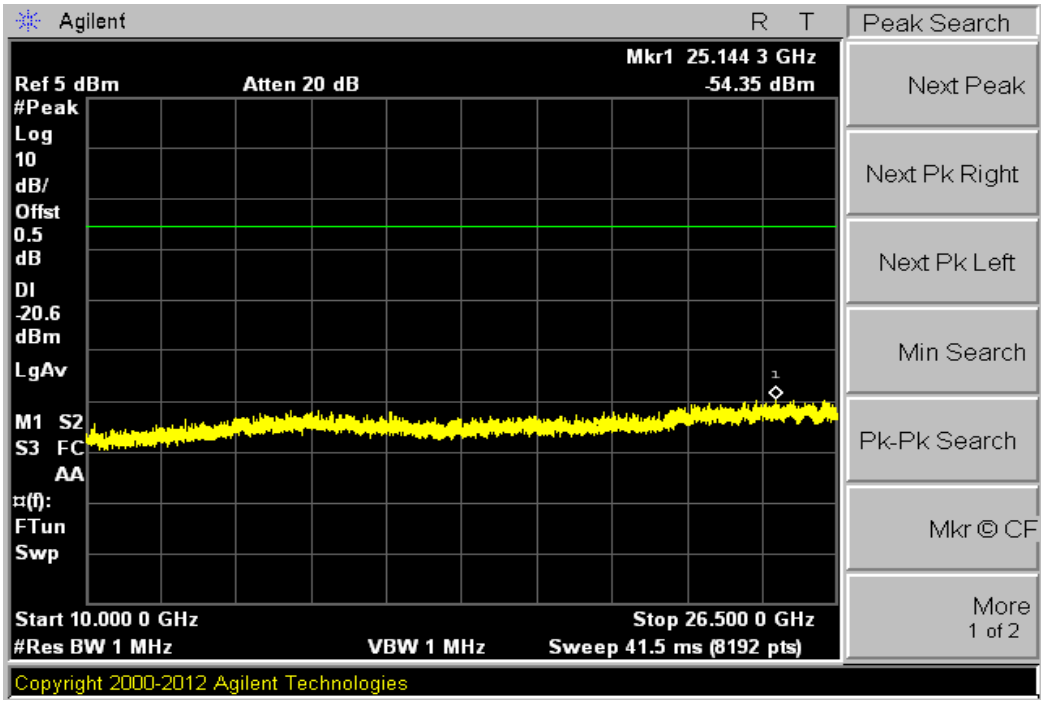
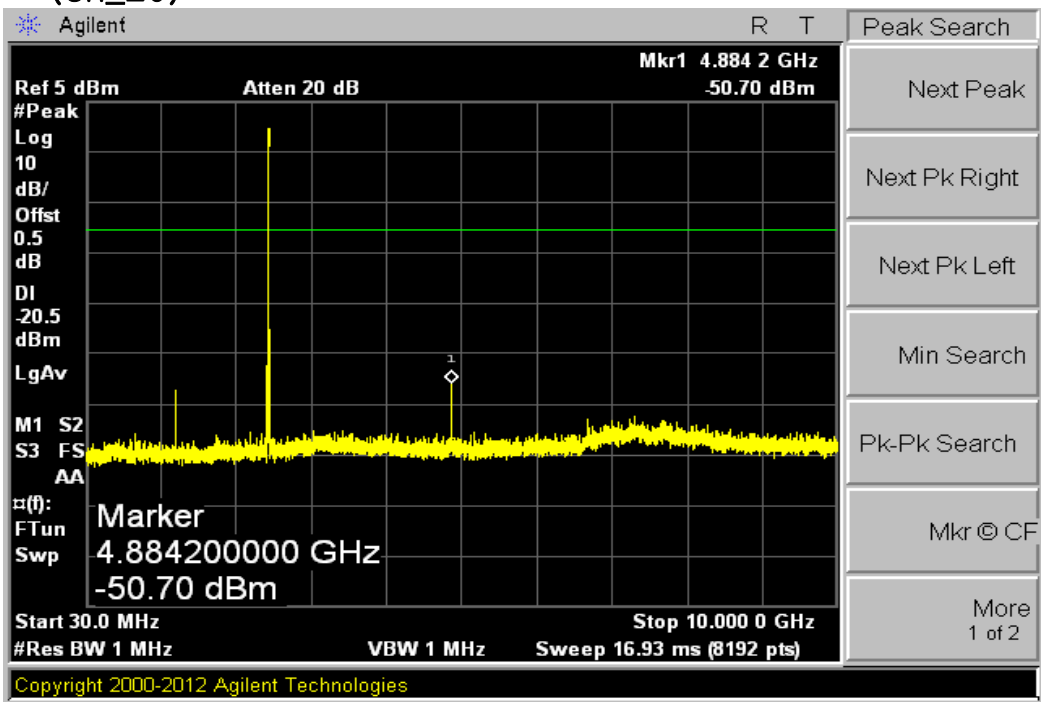


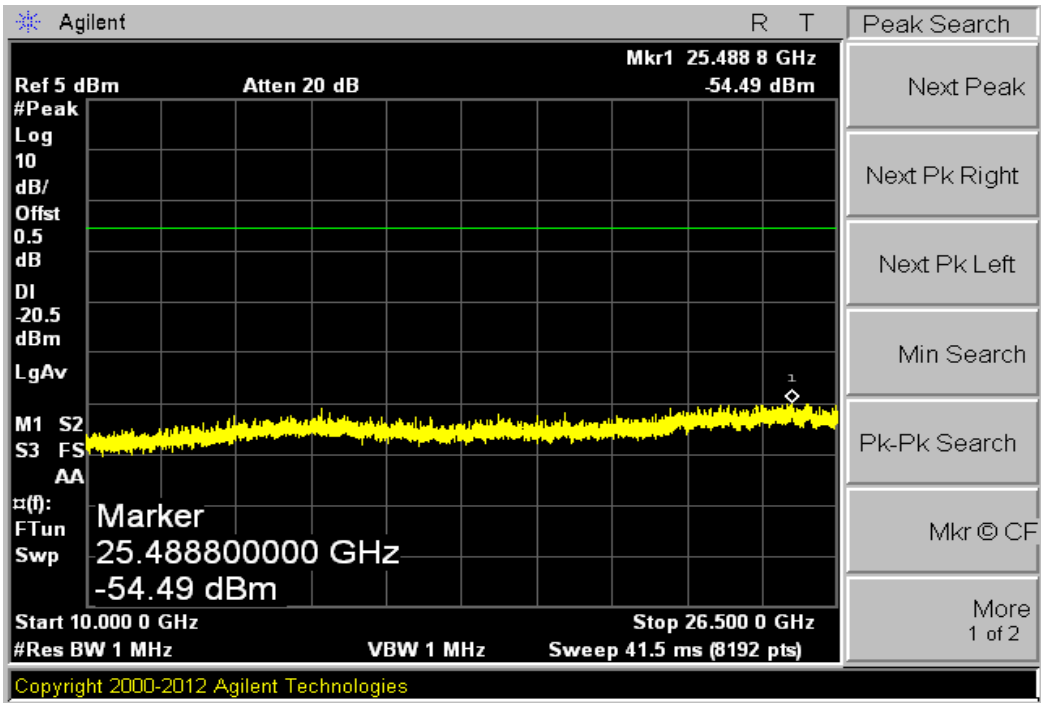
(ch_0)


Agilent
R T
Peak Search
Mkr1 4.805 0 GHz
Ref 5 dBm
Atten 20 dB
-50.12 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.6
dBm
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Start 30.0 MHz
Stop 10.000 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 16.93 ms (8192 pts)
Copyright 2000-2012 Agilent Technologies

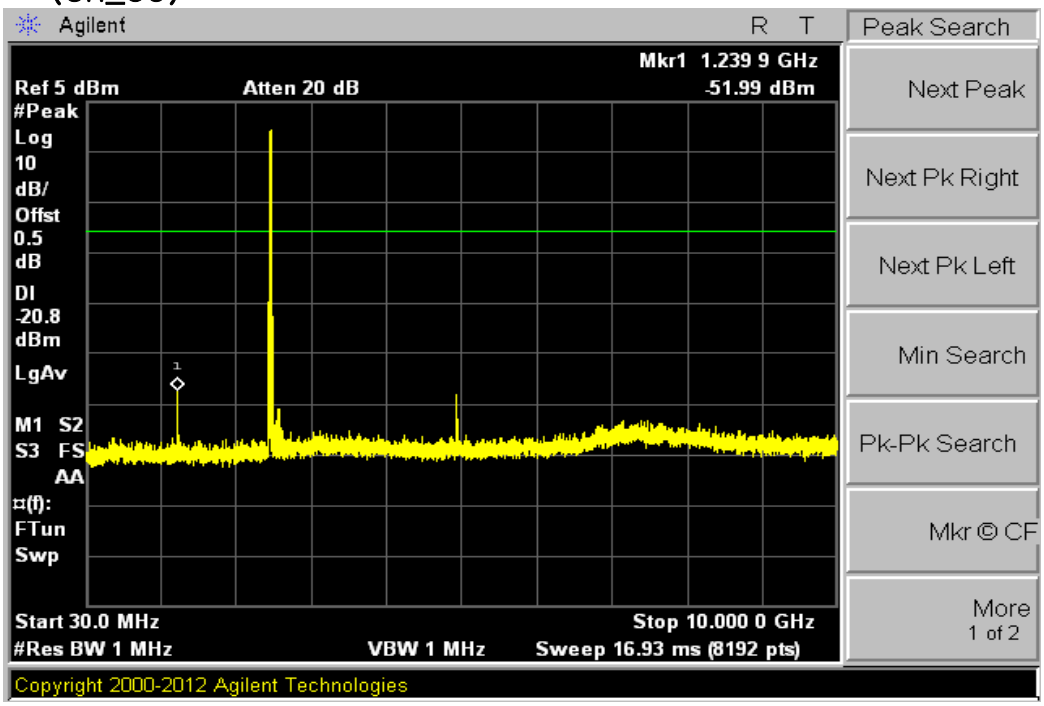

Agilent
R T
Peak Search
Mkr1 25.144 3 GHz
Ref 5 dBm
Atten 20 dB
-54.35 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.6
dBm
LgAv
M1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Start 10.000 0 GHz
Stop 26.500 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 41.5 ms (8192 pts)
Copyright 2000-2012 Agilent Technologies

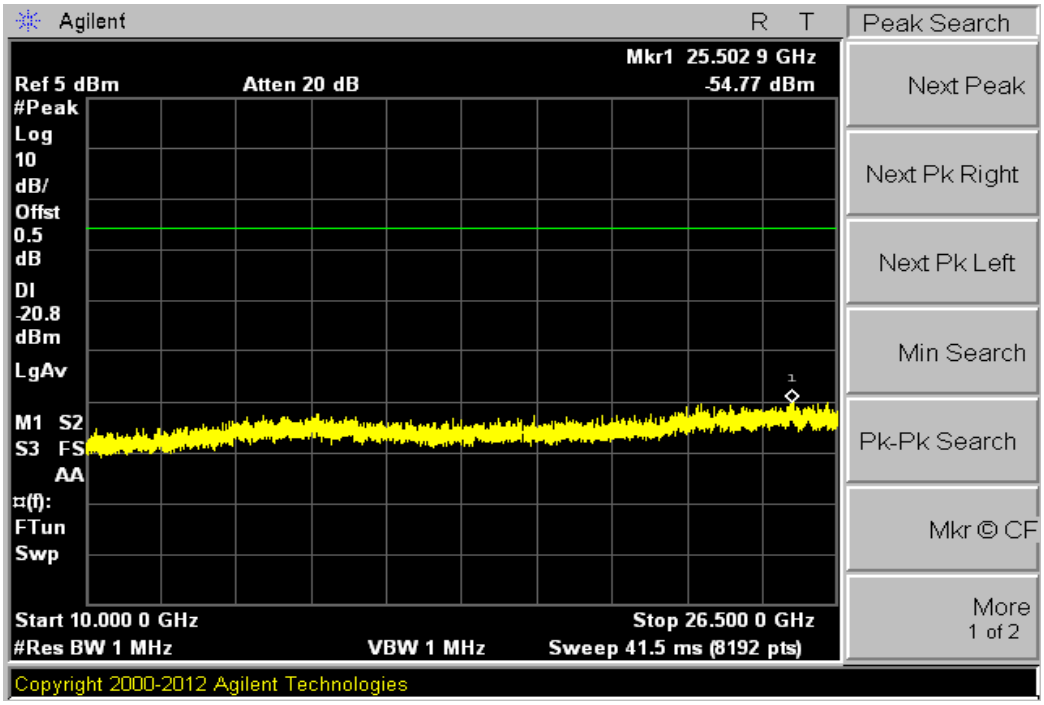
(ch_20)


Agilent
R T
Peak Search
Mkr1 4.884 2 GHz
Ref 5 dBm
Atten 20 dB
-50.70 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.5
dBm
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Marker
4.884200000 GHz
-50.70 dBm
Start 30.0 MHz
Stop 10.000 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 16.93 ms (8192 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 25.488 8 GHz
Ref 5 dBm
Atten 20 dB
-54.49 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.5
dBm
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Marker
25.488800000 GHz
-54.49 dBm
Start 10.000 0 GHz
Stop 26.500 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 41.5 ms (8192 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies

(ch_39)


Agilent
R T
Peak Search
Mkr1 1.239 9 GHz
Ref 5 dBm
Atten 20 dB
-51.99 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.8
dBm
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Start 30.0 MHz
Stop 10.000 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 16.93 ms (8192 pts)
Copyright 2000-2012 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 25.502 9 GHz
Ref 5 dBm
Atten 20 dB
-54.77 dBm
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-20.8
dBm
LgAv
M1 S2
S3 FS
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Start 10.000 0 GHz
Stop 26.500 0 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 41.5 ms (8192 pts)
Copyright 2000-2012 Agilent Technologies

9. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15.205, 15.209 . The test setup was made according to ANSI C 63.10 (2013) & KDB 558074 D01 Semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of styrofoam. turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

9.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	31-Oct-18
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	12-Oct-18
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00581	31-Oct-18
Horn Antenna	BBHA9120D	SCHWARZBECK	469	25-Aug-18
Test Receiver	ESPI7	ROHDE & SCHWARZ	100185	31-Oct-18
Spectrum Analyzer	R3273	ADVANTEST	121200664	10-Oct-18
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Pyramidal Horn Antenna	3160-09-01	EST-LINDGREN	102642	25-Aug-18
Antenna Master & Turn table controller	CO2000-P	Innco System GmbH	CO2000/642 /28051111/L	-

9.2 Environmental Condition

Below 1 GHz -Test Place : 10 m Semi-anechoic chamber

BT(BLE) MODE

Temperature (°C) : 20.4 ℃

Humidity (% R.H.) : 52.2 % R.H.

Above 1 GHz-Test Place : 3 m Semi-anechoic chamber

BT(BLE) MODE

Temperature (°C) : 21.6 ℃

Humidity (% R.H.) : 53.2 % R.H.

9.3 Measurement Instrument setting for Radiated Emission

9.3.1 Frequency range below 1 GHz

Detector : Quasi-Peak

9.3.2 Frequency range above 1 GHz

Peak Power Measurement Procedure (KDB 558074 section 12.2.4)

a. RBW : 1 MHz , VBW : 3 MHz
b. Trace mode = max hold
c. Detector : Peak
d. Sweep time = auto

Average Power Measurement Procedures (KDB 558074 section 12.2.5.2)

a. Set analyzer center frequency to the frequency associated with the emission
b. RBW : 1 MHz , VBW : 3 MHz
c. Detector : RMS
d. Sweep time = auto

Note

Band	Duty cycle(%)	Ton (ms)	Ton + Toff (ms)	DCF=10*log(1/Duty) (dB)
BT(BLE)	79.06	0.497	1.125	1.02

* This was applied of duty cycle factor for average value because of measured with the EUT transmitting continuously less than 98 % duty cycle at its maximum power control level.

9.4 Test data(30 MHz ~ 1 000 MHz)

Test Date : 16-Jan-18 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
65.00	21.88	V	1.2	12.48	1.21	40.00	35.56	4.44
297.00	15.30	H	1.4	13.61	2.69	46.00	31.60	14.40
496.60	19.72	V	1.5	17.89	3.51	46.00	41.12	4.88
551.80	13.57	V	1.6	19.00	3.73	46.00	36.31	9.69
607.00	10.59	V	1.5	19.89	3.95	46.00	34.43	11.57
993.20	5.99	H	1.5	24.47	5.21	54.00	35.67	18.33

Remark	H : Horizontal, V : Vertical TEST MODE : BT BLE (CH : 20 - 2 442 MHz) *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *CL = Cable Loss(In case of below 1 000 MHz) *Result Value = Reading + Ant Factor + Cable loss *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.

9.4-1 Test Data(Low)

Test Date : 16-Jan-18 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2376.00	20.30	H	1.9	26.03	-30.13	0.00	74.00	16.20	57.80
2390.00	23.21	V	1.8	26.06	-30.12	0.00	74.00	19.15	54.85
4804.00	61.58	H	1.7	30.93	-27.04	0.00	74.00	65.47	8.53
4804.00	56.87	V	1.9	30.93	-27.04	0.00	74.00	60.76	13.24
AV(RBW: 1 MHz VBW: 3 MHz)									
2390.00	12.58	H	1.7	26.01	-30.14	1.02	54.00	9.47	44.53
2390.00	12.47	V	1.5	26.02	-30.14	1.02	54.00	9.37	44.63
4804.00	35.64	H	1.8	30.93	-27.04	1.02	54.00	40.55	13.45
4804.00	33.97	V	1.9	30.93	-27.04	1.02	54.00	38.88	15.12
Remark	H : Horizontal, V : Vertical TEST MODE : CH : 0 - 2 402 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction								

9.4-2 Test Data(Middle)

Test Date : 16-Jan-18 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
4884.00	60.55	H	1.9	31.16	-26.81	0.00	74.00	64.90	9.10
4884.00	52.15	V	1.8	31.16	-26.81	0.00	74.00	56.50	17.50
AV(RBW: 1 MHz VBW: 3 MHz)									
4884.00	39.15	H	1.7	31.16	-26.81	1.02	54.00	44.52	9.48
4884.00	34.22	V	1.5	31.16	-26.81	1.02	54.00	39.59	14.41
Remark	H : Horizontal, V : Vertical TEST MODE : CH : 20 - 2 442 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction								

9.4-3 Test Data(High)

Test Date : 16-Jan-18 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2483.50	30.90	H	1.8	26.30	-29.93	0.00	74.00	27.27	46.73
2483.50	23.63	V	1.5	26.30	-29.93	0.00	74.00	20.00	54.00
4960.00	60.15	H	1.7	31.38	-26.70	0.00	74.00	64.83	9.17
4960.00	54.12	V	1.9	31.38	-26.70	0.00	74.00	58.80	15.20
AV(RBW: 1 MHz VBW: 3 MHz)									
2483.50	15.15	H	1.5	26.30	-29.93	1.02	54.00	12.54	41.46
2483.50	12.34	V	1.8	26.30	-29.93	1.02	54.00	9.73	44.27
4960.00	40.11	H	1.8	31.38	-26.70	1.02	54.00	45.81	8.19
4960.00	35.26	V	1.7	31.38	-26.70	1.02	54.00	40.96	13.04

Remark	H : Horizontal, V : Vertical TEST MODE : CH : 39 - 2 480 MHz (x postion) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction

10. Photographs of EUT

[Front]

[Rear]

Appendix 1. Antenna Requirement

1. Antenna Requirement

1.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.204

1.2 Antenna Connected Construction

The antenna types used in this product are Intergrated PCB antenna . The maximum Gain of this antenna is 3.5 dBi.