



**REPORT ON THE CERTIFICATION TESTING OF AN  
IRIDIUM SATELLITE LLC  
IRIDIUM SUBSCRIBER UNIT 9555 (H2)  
RADIATED EMISSION  
WITH RESPECT TO  
FCC RULES CFR 47, PART 25  
AND  
FCC RULES CFR 47, PART 15**

TEST REPORT NO: 9F2707WUS1

COPY NO: PDF

ISSUE NO: 1

FCC ID: Q639555

**REPORT ON THE CERTIFICATION TESTING OF AN  
IRIDIUM SATELLITE LLC  
IRIDIUM SUBSCRIBER UNIT 9555 (H2)  
RADIATED EMISSION  
WITH RESPECT TO  
FCC RULES CFR 47, PART 25  
AND  
FCC RULES CFR 47, PART 15**

TEST DATE: 24<sup>th</sup> September 2009 – 1<sup>st</sup> October 2009

TESTED BY: \_\_\_\_\_

D WINSTANLEY  
PP S HODGKINSON

APPROVED BY: \_\_\_\_\_

J CHARTERS  
RADIO PRODUCT  
MANAGER

DATE: 8<sup>th</sup> October 2009

Distribution:

Copy Nos: Iridium Satellite LLC  
TCB: TRaC Global  
TRaC Telecoms & Radio

THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE

The results herein relate only to the sample tested. Full results are contained in the relevant works order file.

**UP HOLLAND**

Moss View, Nipe Lane, Up Holland, West Lancashire, WN8 9PY, UK.  
T +44 (0)1695 556666 F +44 (0)1695 557077 E test@tracglobal.com  
www.tracglobal.com



FCC IDENTITY: Q639555  
PURPOSE OF TEST: Class II Permissive Change  
TEST SPECIFICATION: FCC Rules CFR 47, Part 25 & Part 15  
TEST RESULT: Compliant to Specification  
ITU EMISSIONS DESIGNATOR: 41K7Q7W  
EQUIPMENT UNDER TEST: Iridium Subscriber Unit 9555 (H2)  
EQUIPMENT TYPE: Satellite Telephone  
PEAK OUTPUT POWER: 12.46dBW, 42.46dBm (See TRL Test Report RU14758798)  
MEAN OUTPUT POWER: 2.10dBW, 32.10 dBm (See TRL Test Report RU14758798)  
CHANNEL SPACING: 41.667 kHz  
NUMBER OF CHANNELS: 252 (240 Transmit Channels)  
MODULATION TYPE: Q7W  
POWER SOURCE(s): +3.7 Vdc  
TEST DATE(s): 24<sup>th</sup> September 2009 – 1<sup>st</sup> October 2009  
APPLICANT: Iridium Satellite LLC  
ADDRESS: 6707 Democracy Blvd.  
Suite 300  
Bethesda  
United States of America  
MD 20817

TESTED BY: ..... D WINSTANLEY

APPROVED BY: ..... J CHARTERS  
RADIO  
PRODUCT  
MANAGER



### EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	FCC Part 2	FCC Part 25	APPLICABILITY	RESULT
	Spurious Emissions Radiated	2.1053	25.202 (f) 25.213	YES	PASS

Note: The Iridium Subscriber Unit 9555 (H2) is subject to FCC Part 25 & Part 2 for FCC Certification for units marketed within the United States. The above tests, as specified in FCC Part 2, with limits as defined in FCC Part 25 were performed on the Iridium Subscriber Unit 9555 (H2).

2. Product Use: Satellite Telephone and Data Communications

3. Emission Designator: 41k7Q7W

4. Temperatures: Ambient 16°C  
(Tnom)

5. Supply Voltages: Vnom +3.7 Vdc

Note: Vnom voltages are as stated above unless otherwise shown on the test report page

6. Equipment Category: Single channel   
Two channel   
Multi-channel

7. Channel spacing: Narrowband  41.667 kHz  
Wideband

8. Test Location: TRaC Telecoms & Radio  
Up Holland   
Hull

9. Modifications made during test program: No modifications were performed.

## Product Description

The satellite telephone consists of an L-Band Transceiver (LBT) capable of simultaneous transmit and receive (duplex) operation covering the frequency range of 1616MHz to 1626.5MHz. The frequency accesses used for duplex channels are organised into sub-bands each of which contains eight frequency accesses. Each sub-band, therefore occupies 333.33 kHz (i.e.  $8 \times 41.667\text{kHz}$ ). Up to 30 sub-bands containing 240 frequency accesses may be used for duplex channels.

## Standard References

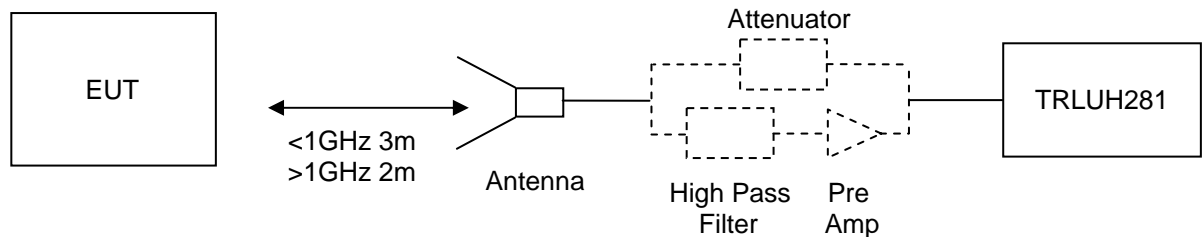
- |   |   |
|---|---|
| 47 CFR 2<br>Matters;<br>10-1-03 Edition | Code of Federal Regulations, Title 47, Part 2, "Frequency allocations and Radio Telemetry<br>General Rules and Regulations"   |
| 47 CFR 25<br>10-1-03 Edition            | Code of Federal Regulations, Title 47, Part 25, "Sattelite Communications" Subpart C,<br>"Technical Matters"  |
| 47 CFR 15<br>20-09-07 Edition           | Code of Federal Regulations, Title 47, Part 15, "Radio Frequency Devices" Subpart B,<br>"Unintentional Radiators"   |
| C63.4-2003                              | American National Standards Institute (ANSI), "Methods of Measurement of Radio Noise<br>Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9 kHz to 40<br>GHz" |

**COMPLIANCE TESTS**

**TRANSMITTER TESTS**

**SPURIOUS EMISSIONS – RADIATED – PART 25.202 (f) & 25.213**

Ambient temperature = 18°C  
 Relative humidity = 69%  
 Conditions = OATS  
 Supply voltage = +3.7 Vdc  
 Supply Frequency = N/A



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on four channels. The unit was put into test mode and set to operate at maximum power and with a tone modulating signal using test commands sent from a PC via the MAMBO Box. The unit was mounted on a turntable and rotated through 360° to find the worst case emission.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more than 250% of the authorised bandwidth

At least 43 + 10 log PdB

$$(10\log P_{\text{watts}}) - (43 + 10\log (P_{\text{watts}} * 1000)) = \text{LIMIT} = -13 \text{ dBm}$$

**RESULTS**

FREQUENCY RANGE	CHANNEL NUMBER	FREQ. (MHz)	ERP/EIRP (dBm)	LIMIT (dBm)
30MHz – 1559MHz	No Significant Emissions within 20 dBs of the Limit			-13
1559MHz – 1605MHz	No Significant Emissions within 20 dBs of the Limit			-40
1605MHz – 1610MHz	No Significant Emissions within 20 dBs of the Limit			-40 to 10 Note 4
1628.5MHz – 16.3 GHz	1	3232.040	-44.20	-13
	240	3251.967	-42.80	-13
	1	4848.056	-31.50	-13
	240	4877.876	-30.50	-13
	1	6464.076	-38.42	-13
	240	6503.915	-40.04	-13

- Notes :
1. Emissions Checked up to 10 times Fc.
  2. Scan plots of channels 1 & 240 with receive antenna in vertical polarization in annex H.
  3. The unit was mounted on a turntable and rotated through 360° and in 3 orthogonal planes to find the worst case emission.
  4. -40 to -10 Linearly interpolated in dBm Vs frequency offset.
  5. Correction Factor for dBm to dBW = -30dB.
  6. Fully charged batteries were used for each channel.

The H2 handset was found to comply with the limits. See annex I for plots



## UNINTENTIONAL TRANSMITTER TESTS

### UNINTENTIONAL TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.109

Ambient temperature	=	17°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	66% (<1GHz),	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[ ]
Supply voltage	=	+3.7Vdc		

	FREQ. (MHz)	MEAS Rx (dBµV)	CABLE LOSS (dB)	ANT FACT. (dB/m)	PRE AMP (dB)	FIELD ST'GH (dBµV/m)	EXTRAP FACT (dB)	FIELD ST'GH (µV/m)	LIMIT (µV/m)
0.009MHz - 0.49MHz									Note 4
0.49MHz - 1.705MHz									Note 4
1.705MHz - 30MHz									Note 4
30MHz - 88MHz	38.15	21.76	0.65	13.59		36.00		63.09	100
	39.05	23.86	0.61	12.53		37.00		70.79	100
	39.50	20.36	0.61	12.53		33.50		47.31	100
	40.00	20.36	0.61	12.53		33.50		47.31	100
	78.15	23.19	0.92	6.39		30.50		33.49	100
	78.50	24.59	0.92	6.39		31.90		39.35	100
	79.20	24.27	0.93	6.50		31.70		38.45	100
	80.35	23.08	0.94	6.68		30.70		34.27	100
88MHz - 216MHz									
216MHz - 960MHz	300.65	12.15	1.97	12.98		27.10		22.64	200
	400.85	9.68	2.18	15.94		27.80		24.54	200
	497.55	21.68	2.70	17.22		41.60		120.22	200
	719.95	16.69	3.50	19.31		39.50		94.00	200
960MHz - 1GHz								Note 4	
1GHz - 16.3GHz	1410.961	54.65	1.7	26.0	36.9	45.45	9.54	62.44	500
	8406.128	48.44	2.3	38.4	36.5	52.64	9.54	142.90	500
	8465.897	50.70	2.1	38.4	36.5	54.70	9.54	181.13	500
Limits	0.009 MHz to 0.49 MHz			2400/f(kHz) µV/m @ 300m					
	0.49 MHz to 1.705 MHz			24000/f(kHz) µV/m @ 30m					
	1.705MHz to 30MHz			30µV/m @ 30m					
	30MHz to 88MHz			100µV/m @ 3m					
	88MHz to 216MHz			150µV/m @ 3m					
	216MHz to 960MHz			200µV/m @ 3m					
	960MHz to 1GHz			500µV/m @ 3m					
	1GHz to 16.3GHz			500µV/m @ 3m					

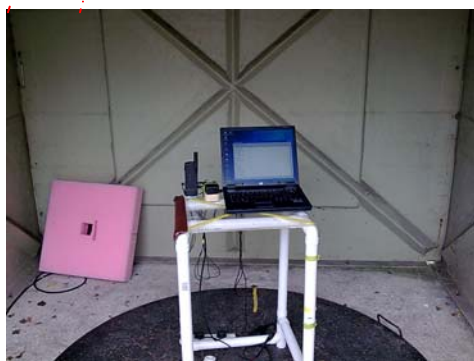
- Notes:**
- 1 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
  - 2 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
  - 3 Receiver detector >1GHz = Average, 1MHz resolution bandwidth
  - 4 Only emissions within 20 dB of the limit are recorded.
  - 5 See annex M for emissions plots

- Test Method:**
- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
  - 2 Measuring distances as Notes 1 to 4 above
  - 3 EUT 0.8 metre above ground plane
  - 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
Raising and lowering the receiver antenna between 1m & 4m.  
Horizontal and vertical polarisations, of the receive antenna.  
EUT orientation in three orthogonal planes.  
Maximum results recorded.

**ANNEX A**  
**PHOTOGRAPHS**

PHOTOGRAPH 1.

**RADIATED TEST SETUP**



PHOTOGRAPH 2.

OVERVIEW



**ANNEX B**  
**APPLICANT'S SUBMISSION OF DOCUMENTATION LIST**

### APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[ ]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[ ]
		-	DECLARATION	[ ]
		-	DRAWINGS	[ ]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
h.	CIRCUIT DIAGRAMS	-	Tx	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
i.	COMPONENT LOCATION	-	Tx	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

**ANNEX C**  
**TEST EQUIPMENT LIST**

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No
HORN	EMCO	3115	9010-3580	138
HORN	EMCO	3115	9010-3581	139
10 dB ATTENUATOR	BIRD	8304-100-N	N/A	222
PRE AMPLIFIER	AGILENT	8449B	2118	572
BILOG ANTENNA	CHASE	CBL6112B	2803	UH93
RECEIVER	R&S	ESVS 10	841431/014	UH186
SPECTRUM ANALYSER	R&S	FSU 46	200034	UH281
HIGH PASS FILTER	BSC FILTERS	SH4141	973501	RFG 445
HIGH PASS FILTER	BSC FILTERS	SH4141	973501	RFG 445



**ANNEX D**  
**TEST EQUIPMENT CALIBRATION**

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH06/07	IC OATS Submission	TRL	02/07/2009	24	02/07/2011
UH06/07	NSA Calibration	TRL	19/06/2009	12	19/06/2010
UH028	Log Periodic Ant	Schwarbeck	06/05/2008	24	06/05/2010
UH029	Bicone Antenna	Schwarbeck	06/05/2008	24	06/05/2010
UH093	Bilog	Schaffner		24	
UH191	Bilog	Chase		24	
UH162	ERP Cable Cal	TRL	01/03/2009	12	01/03/2010
UH281	Spectrum Analyser	R&S	28/10/2008	12	28/10/2009
L138	1-18GHz Horn	EMCO	10/09/2009	24	10/09/2011
L139	1-18GHz Horn	EMCO	17/08/2009	24	17/08/2011
L193	Bicone Antenna	Chase	06/05/2008	24	06/05/2010
L203	Log Periodic Ant	Chase	06/05/2008	24	06/05/2010
L222	Attenuator	Bird		Calibrate In use	
L254	Signal Generator	Marconi	25/02/2009	12	25/02/2010
L572	Pre Amp	Agilent	15/07/2009	12	15/07/2010
RFG445	High Pass Filter	BSC	15/07/2009	12	15/07/2010

**ANNEX E**  
**MEASUREMENT UNCERTAINTY**

## Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

### **[1] Adjacent Channel Power**

Uncertainty in test result = **1.86dB**

### **[2] Carrier Power**

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRL05) = **1.08dB**

Uncertainty in test result (Equipment – TRL479) = **2.48dB**

### **[3] Effective Radiated Power**

Uncertainty in test result = **4.71dB**

### **[4] Spurious Emissions**

Uncertainty in test result = **4.75dB**

### **[5] Maximum frequency error**

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**

Uncertainty in test result (Equipment – TRL05) = **0.113ppm**

Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

### **[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field**

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**,

Uncertainty in test result (1GHz-18GHz) = **4.7dB**

### **[7] Frequency deviation**

Uncertainty in test result = **3.2%**

### **[8] Magnetic Field Emissions**

Uncertainty in test result = **2.3dB**

### **[9] Conducted Spurious**

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

### **[10] Channel Bandwidth**

Uncertainty in test result = **15.5%**

### **[11] Amplitude and Time Measurement – Oscilloscope**

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%**, Uncertainty in Amplitude measurement = **0.82%**

### **[11] Power Line Conduction**

Uncertainty in test result = **3.4dB**

**[12] Spectrum Mask Measurements**

Uncertainty in test result = **2.59% (frequency)**  
Uncertainty in test result = **1.32dB (amplitude)**

**[13] Adjacent Sub Band Selectivity**

Uncertainty in test result = **1.24dB**

**[14] Receiver Blocking – Listen Mode, Radiated**

Uncertainty in test result = **3.42dB**

**[15] Receiver Blocking – Talk Mode, Radiated**

Uncertainty in test result = **3.36dB**

**[16] Receiver Blocking – Talk Mode, Conducted**

Uncertainty in test result = **1.24dB**

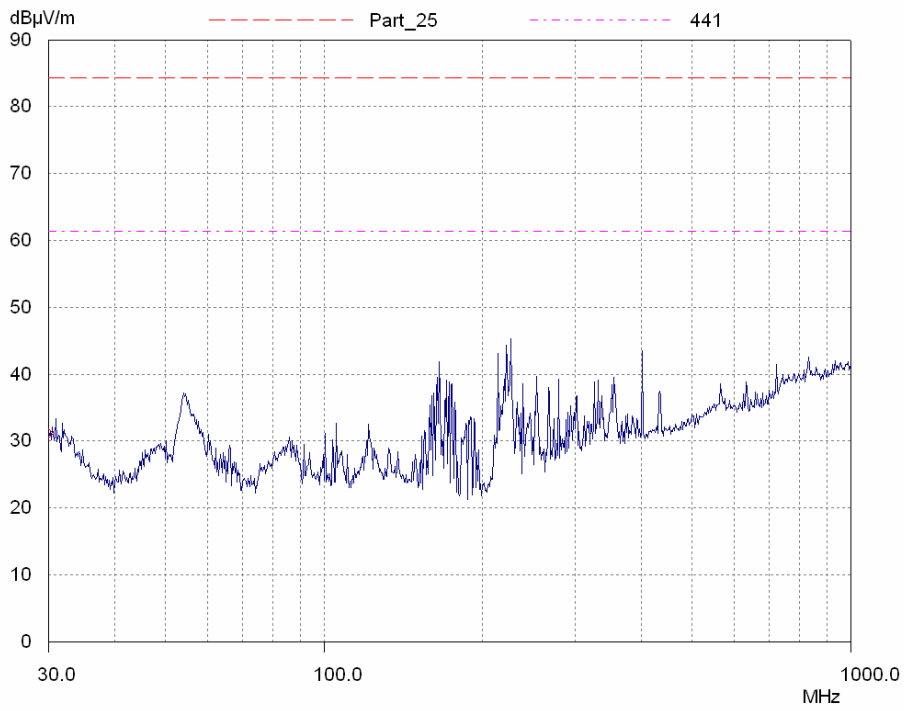
**[17] Receiver Threshold**

Uncertainty in test result = **3.23dB**

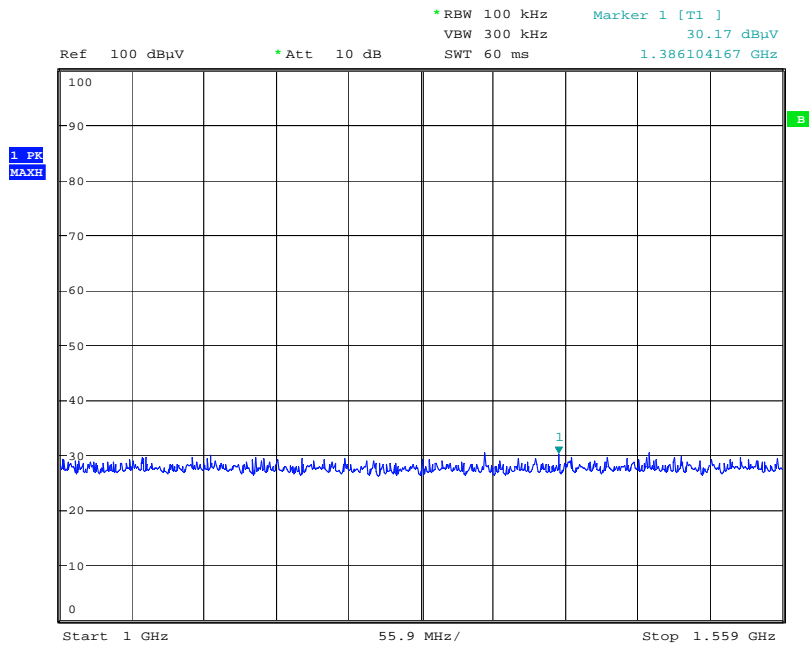
**[18] Transmission Time Measurement**

Uncertainty in test result = **7.98%**

**ANNEX F**  
**TRANSMITTER SPURIOUS EMISSIONS – Radiated**



30MHz – 1000MHz

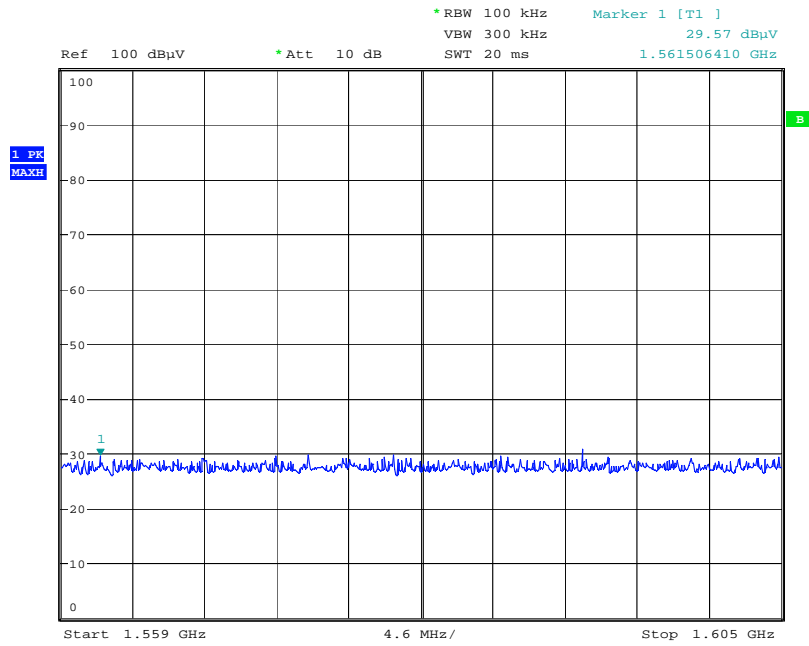


Date: 28.SEP.2009 13:54:43

1000MHz – 1559MHz

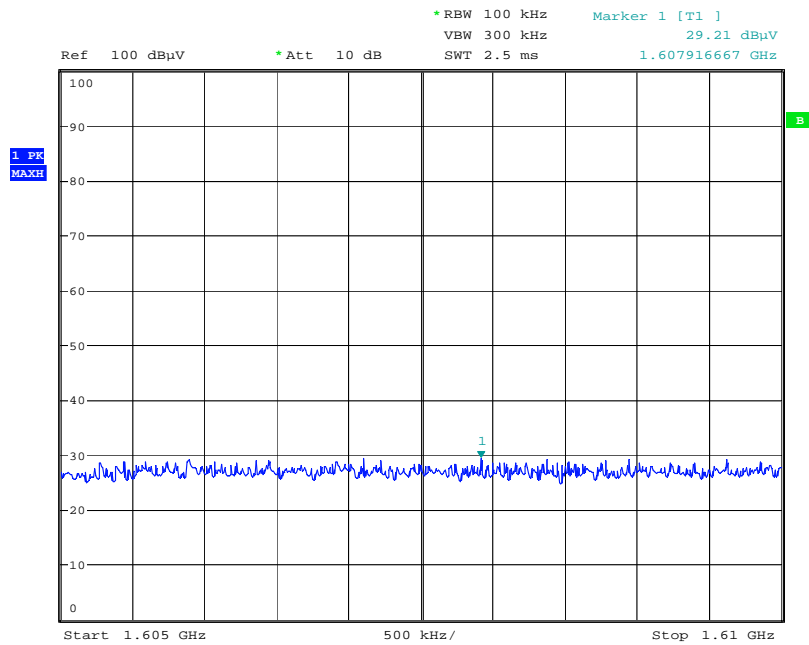
# TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 28.SEP.2009 13:54:58

## 1559MHz – 1605MHz



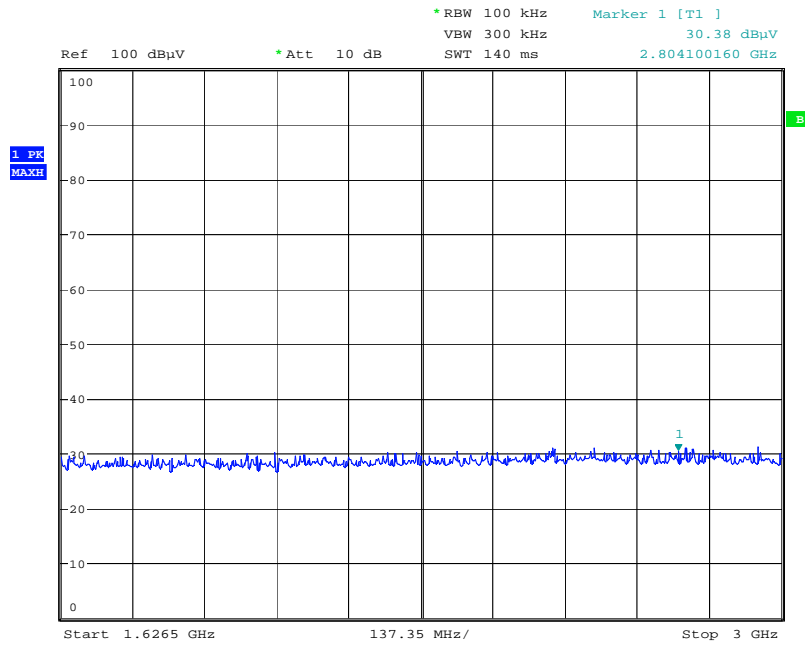
Date: 28.SEP.2009 13:55:39

## 1605MHz – 1610MHz



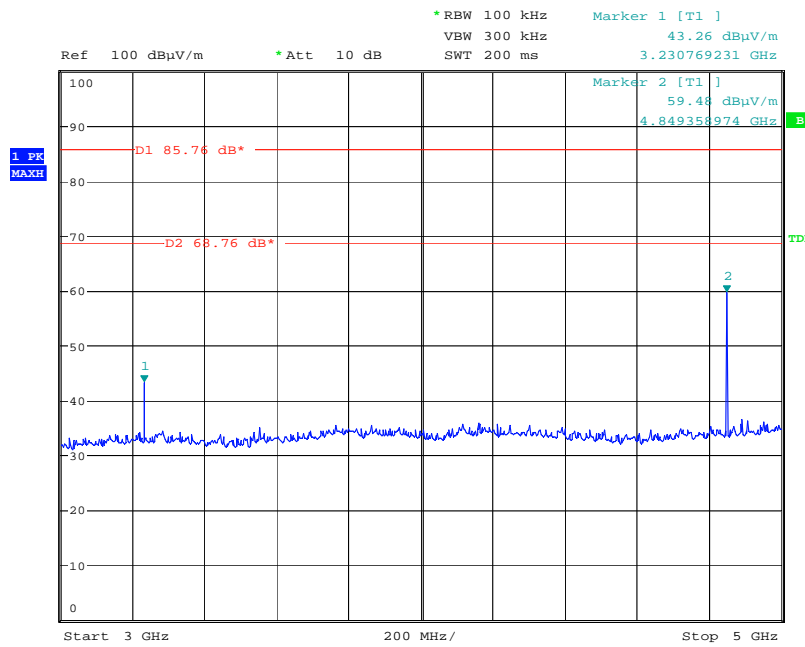
# TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 28.SEP.2009 13:55:54

## 1626.5MHz – 3000MHz

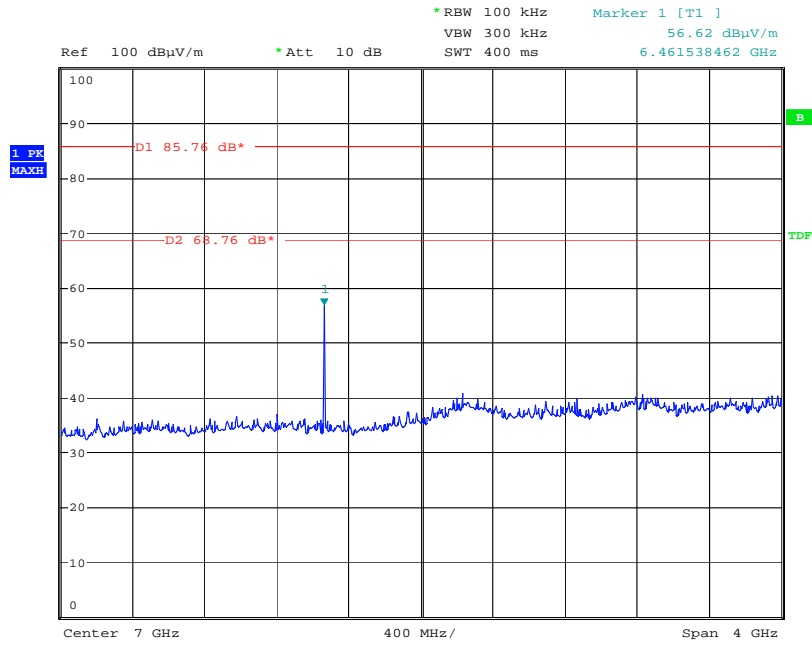


Date: 28.SEP.2009 12:06:40

## 3GHz – 5GHz

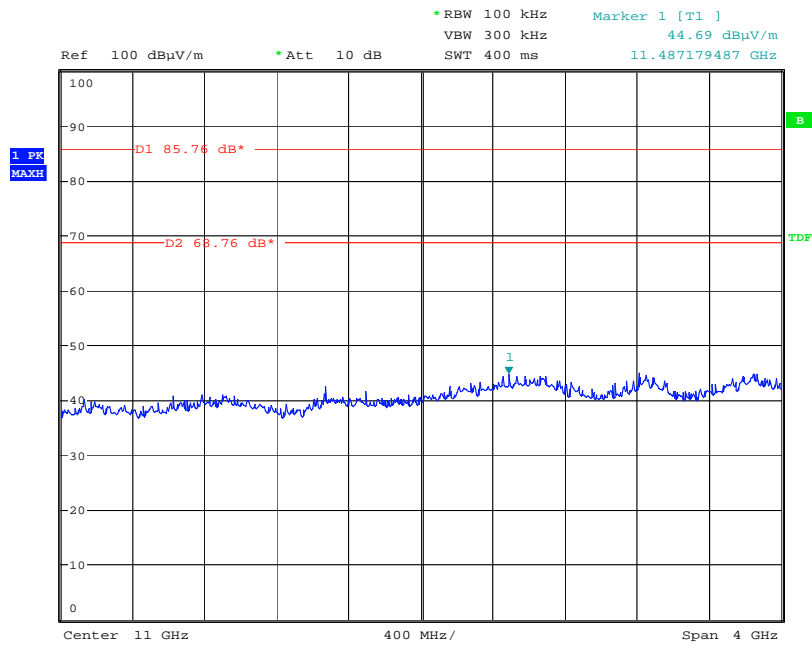
# TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 28.SEP.2009 12:05:35

## 5GHz – 9GHz

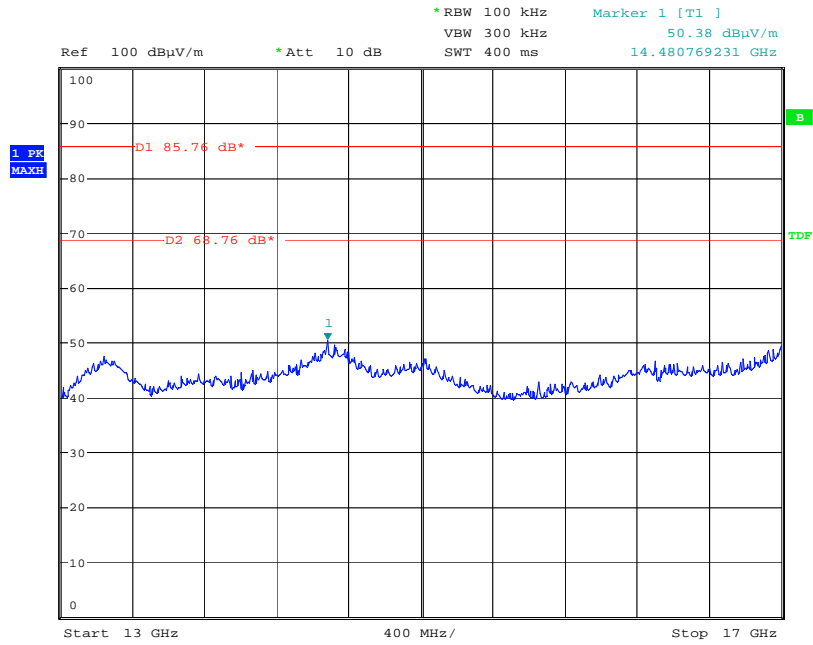


Date: 28.SEP.2009 12:04:53

## 9GHz – 13GHz

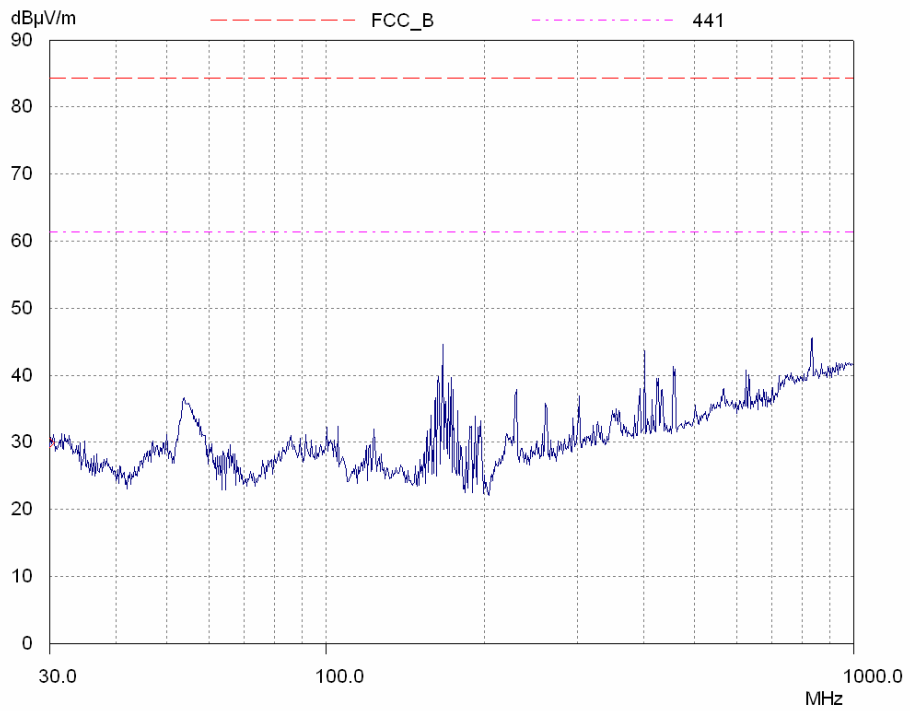
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1

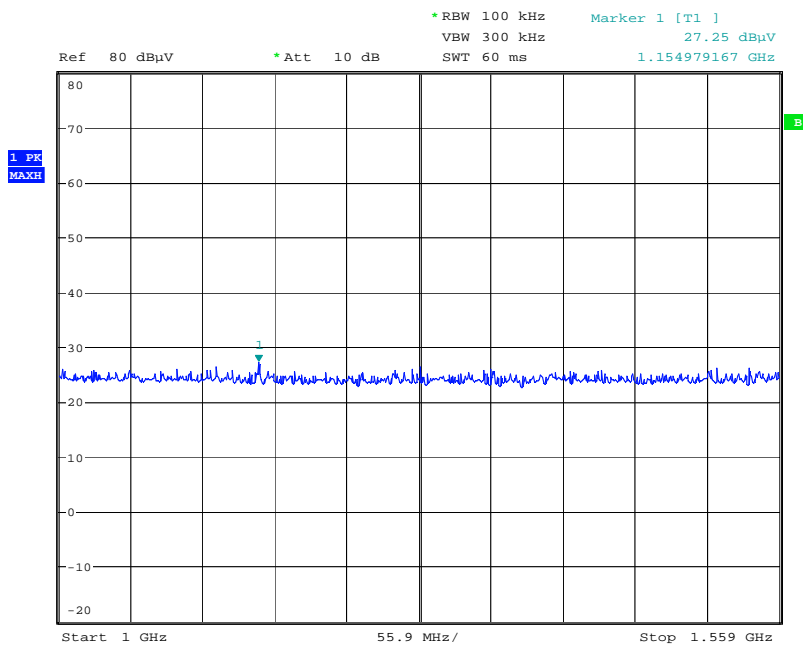


Date: 28.SEP.2009 12:04:33

13GHz – 17GHz



30MHz – 1000MHz

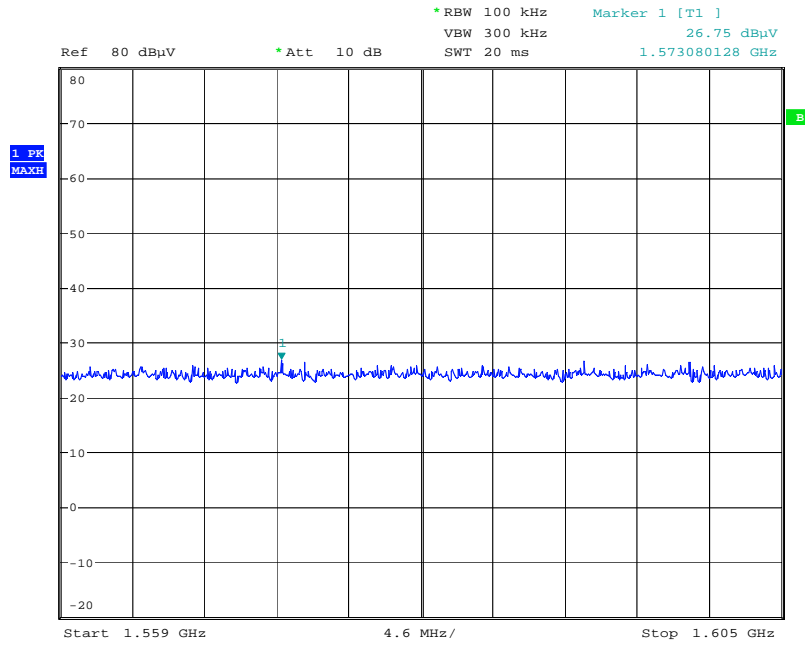


Date: 28.SEP.2009 13:37:55

1000MHz – 1559MHz

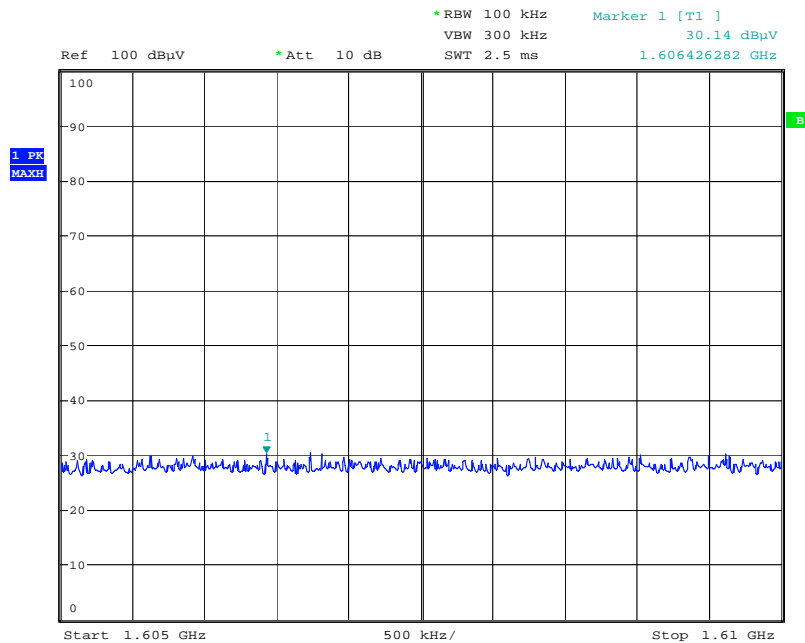
# TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 28.SEP.2009 13:39:15

## 1559MHz – 1605MHz

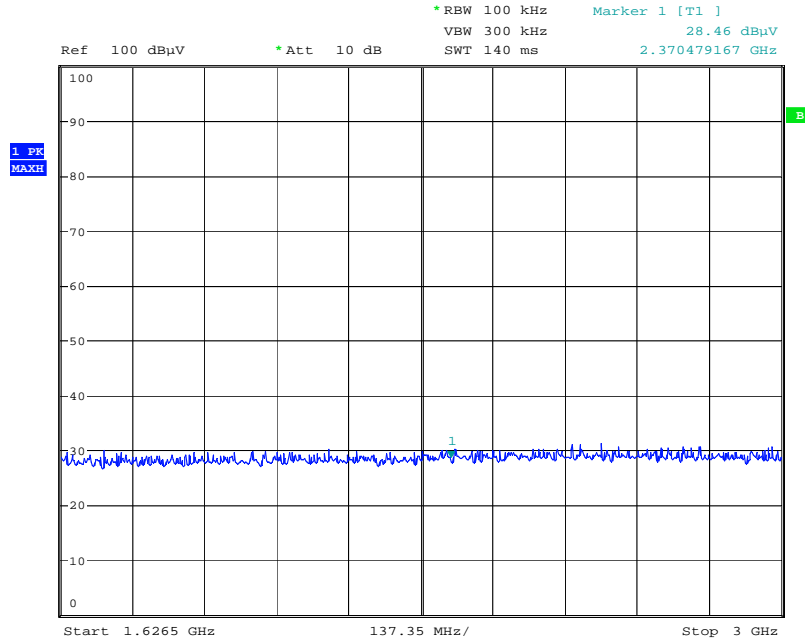


Date: 28.SEP.2009 13:48:40

## 1605MHz – 1610MHz

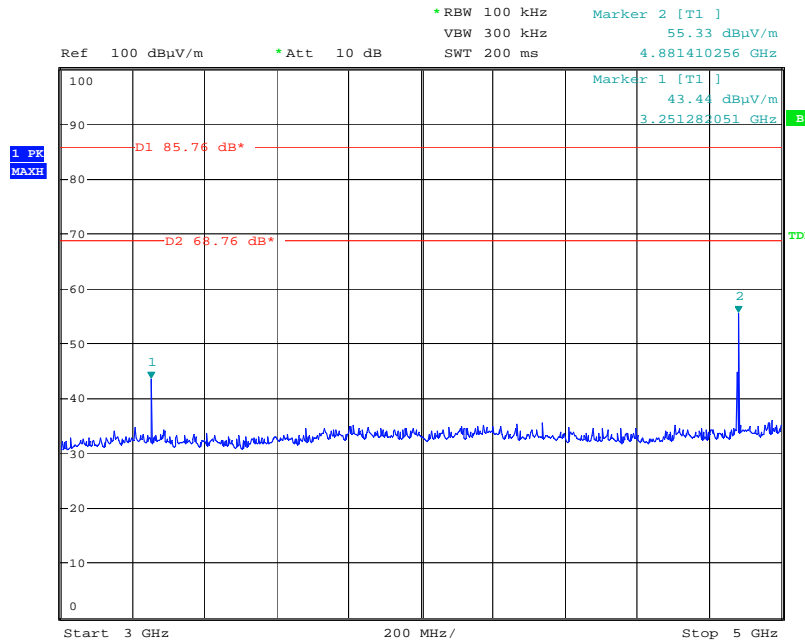
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 28.SEP.2009 13:40:39

1626.5MHz – 3000MHz

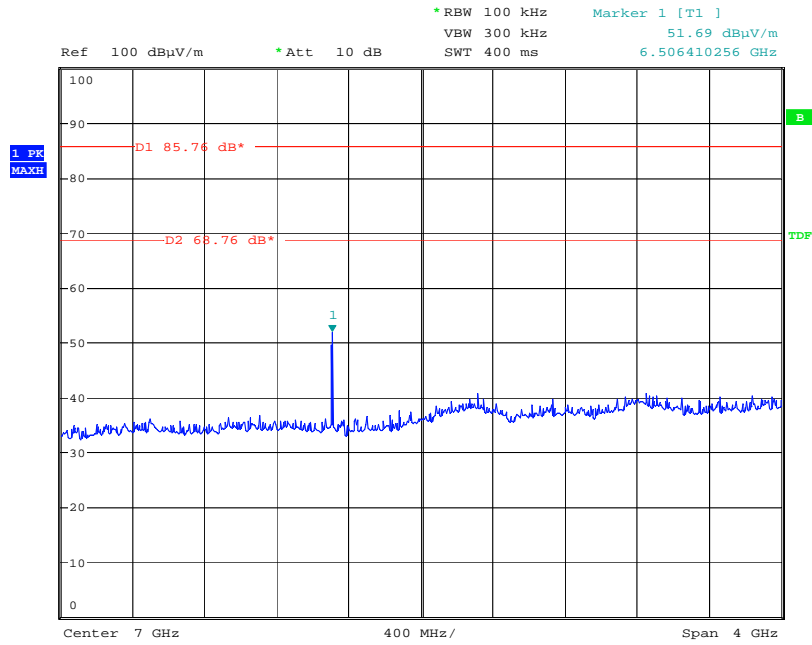


Date: 28.SEP.2009 12:14:19

3GHz – 5GHz

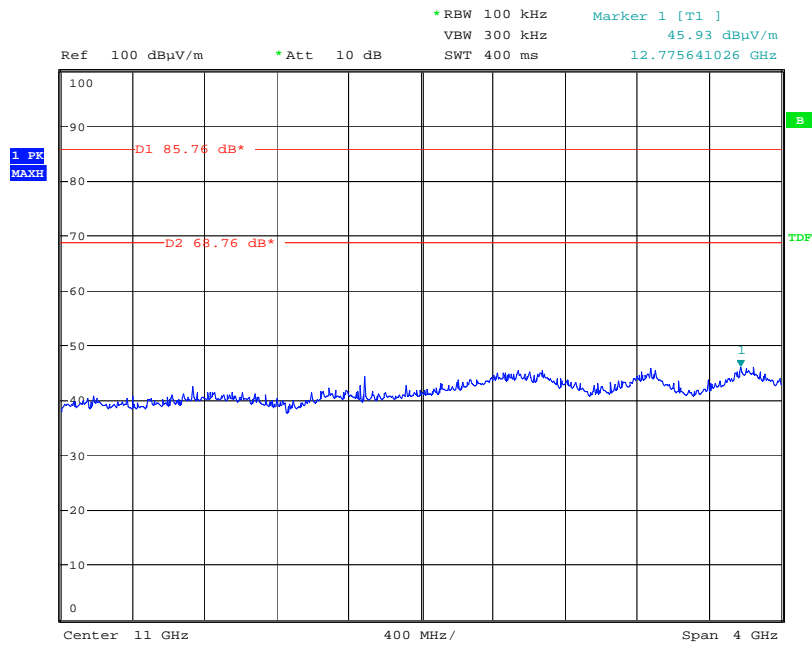
# TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 28.SEP.2009 12:13:53

## 5GHz – 9GHz

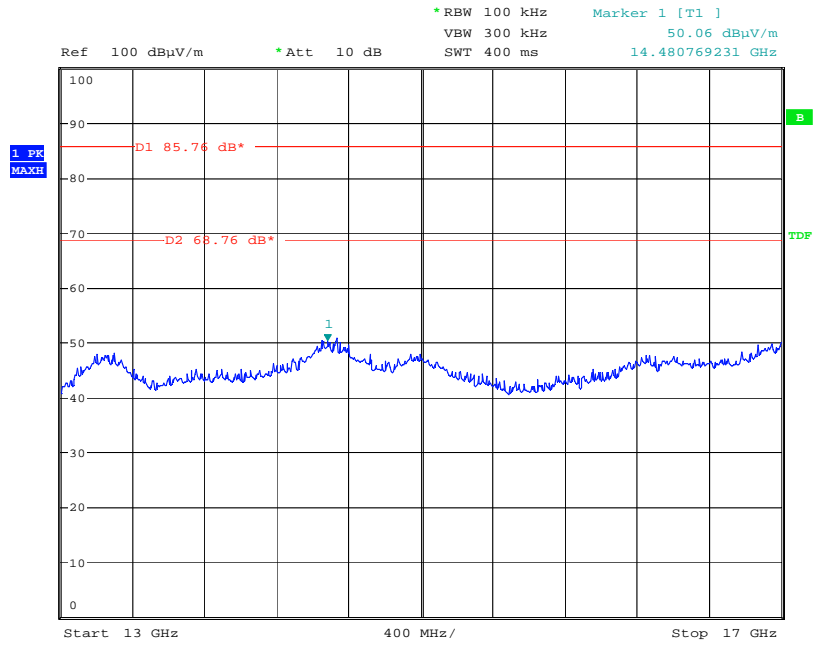


Date: 28.SEP.2009 12:13:42

## 9GHz – 13GHz

TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 28.SEP.2009 12:12:22

13GHz – 17GHz

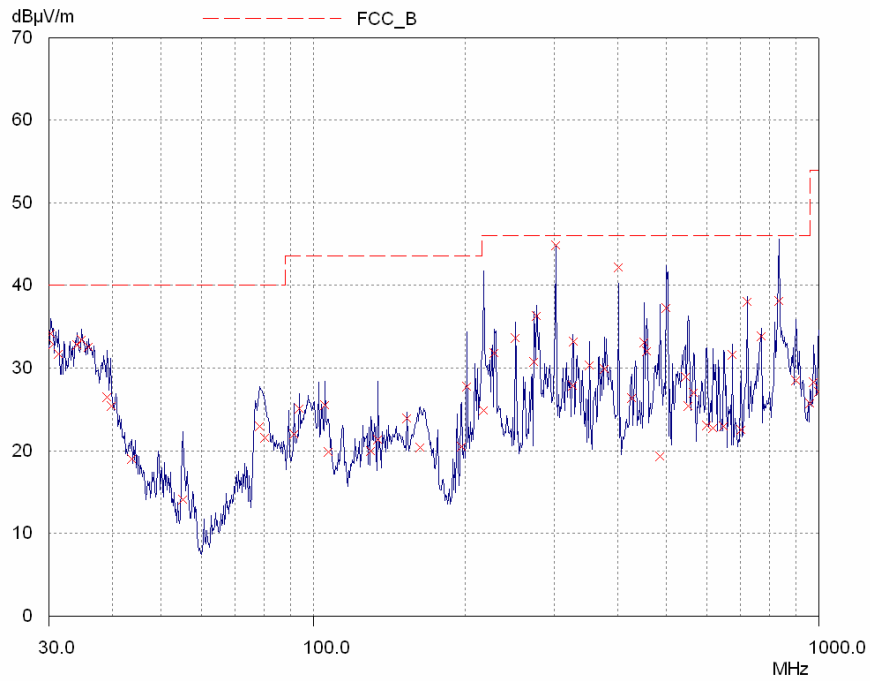


**ANNEX G**

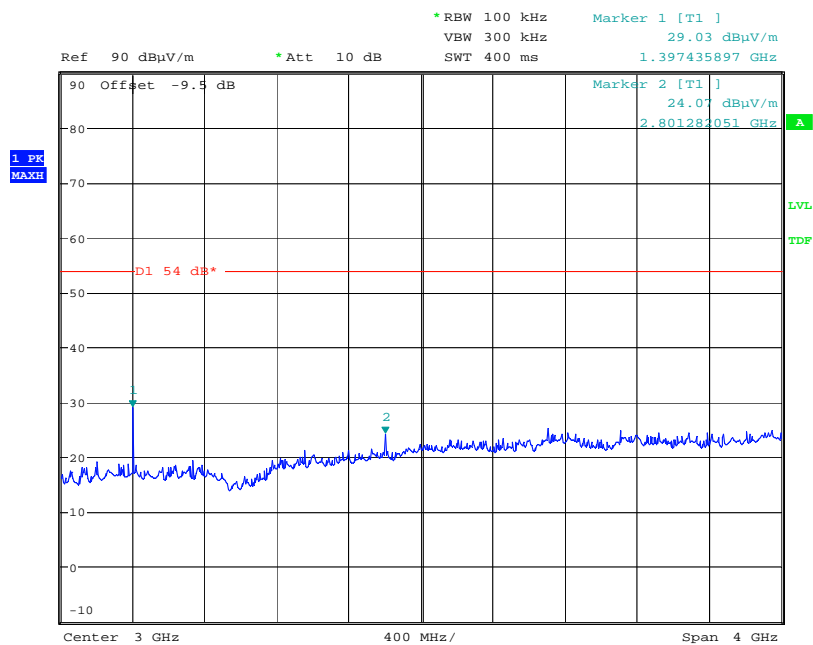
**UNINTENTIONAL TRANSMITTER SPURIOUS EMISSIONS – Radiated**

UNINTENTIONAL SPURIOUS EMISSIONS – Radiated

Channel 1



30MHz – 1000MHz

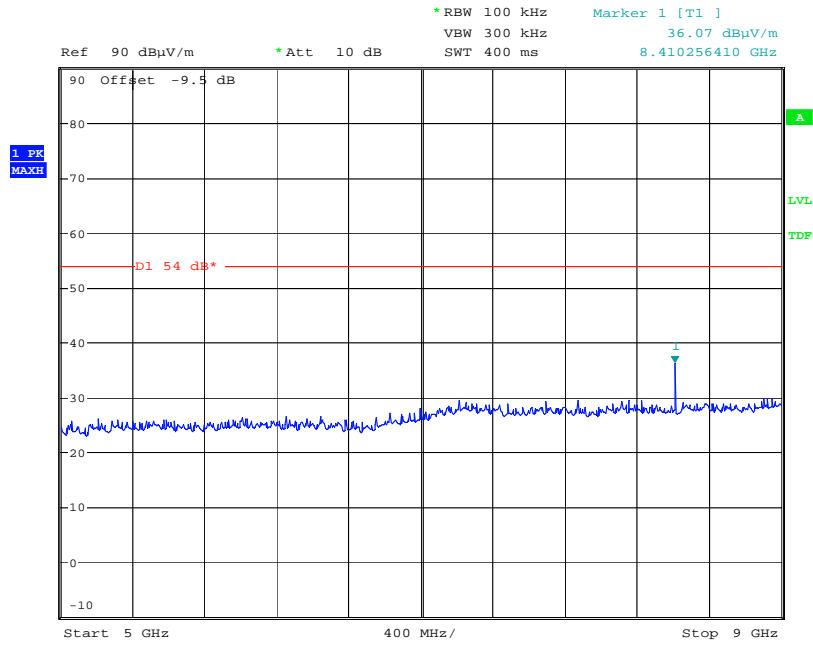


Date: 25.SEP.2009 10:59:28

1GHz – 5GHz

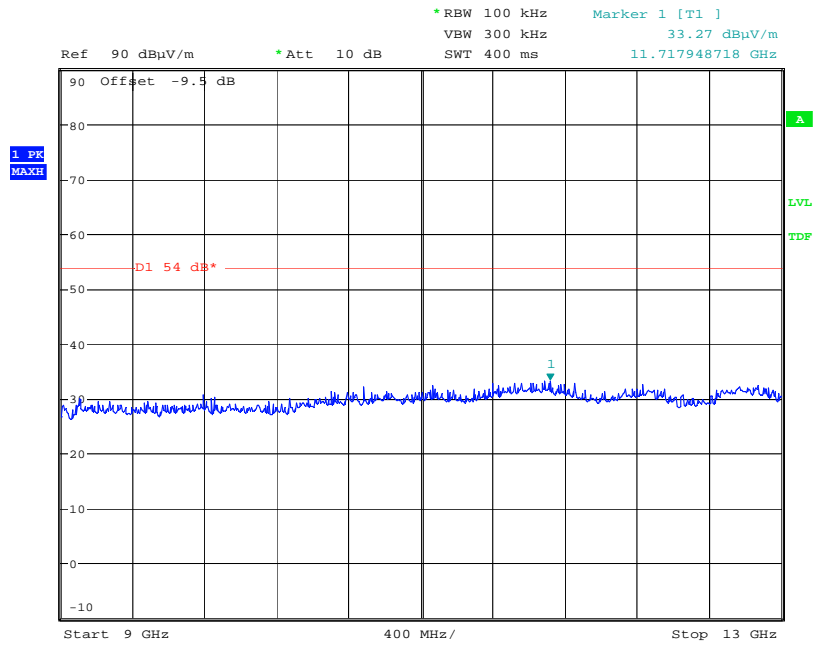
UNINTENTIONAL SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 25.SEP.2009 10:56:14

5GHz – 9GHz

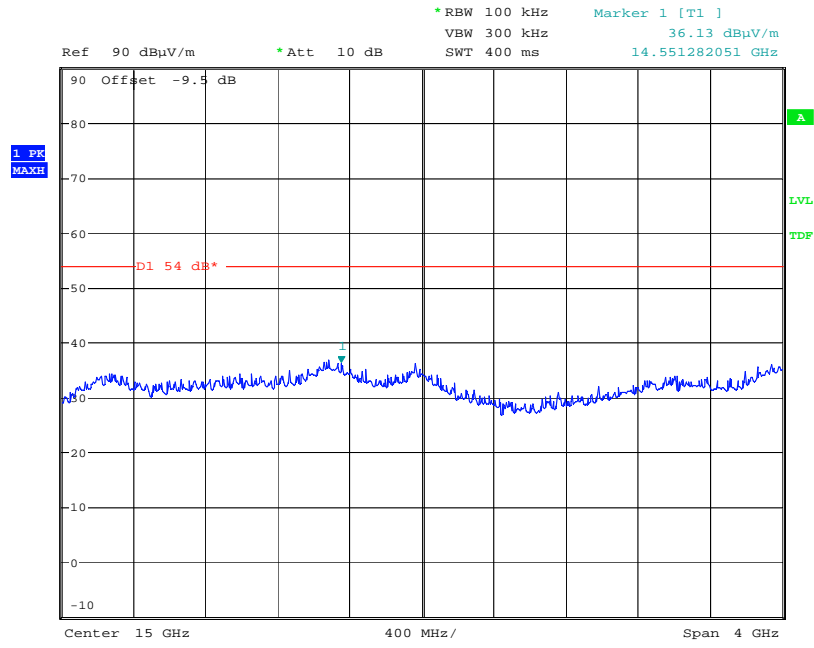


Date: 25.SEP.2009 11:00:11

9GHz – 13GHz

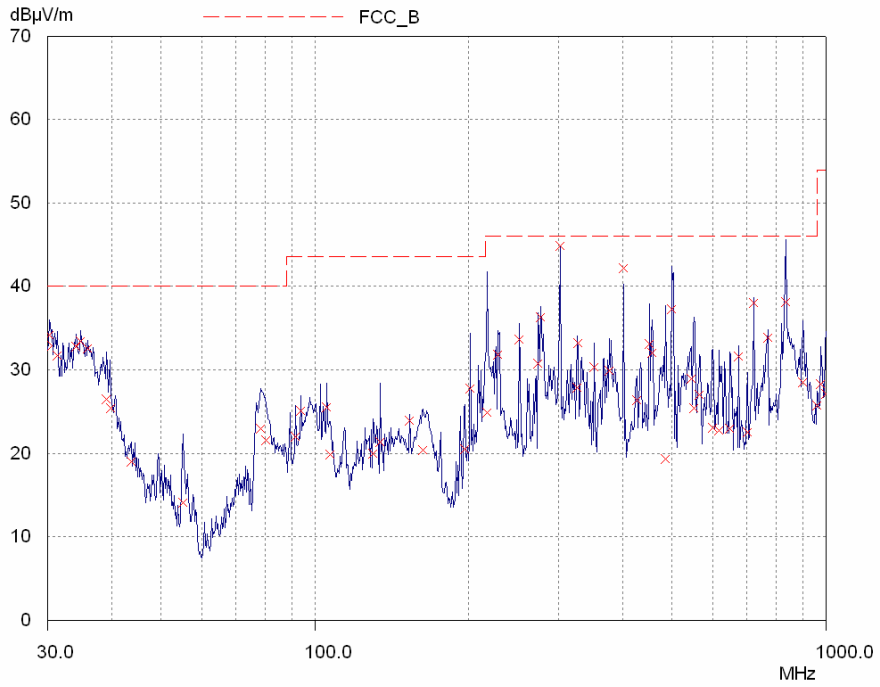
UNINTENTIONAL SPURIOUS EMISSIONS – Radiated

Channel 1

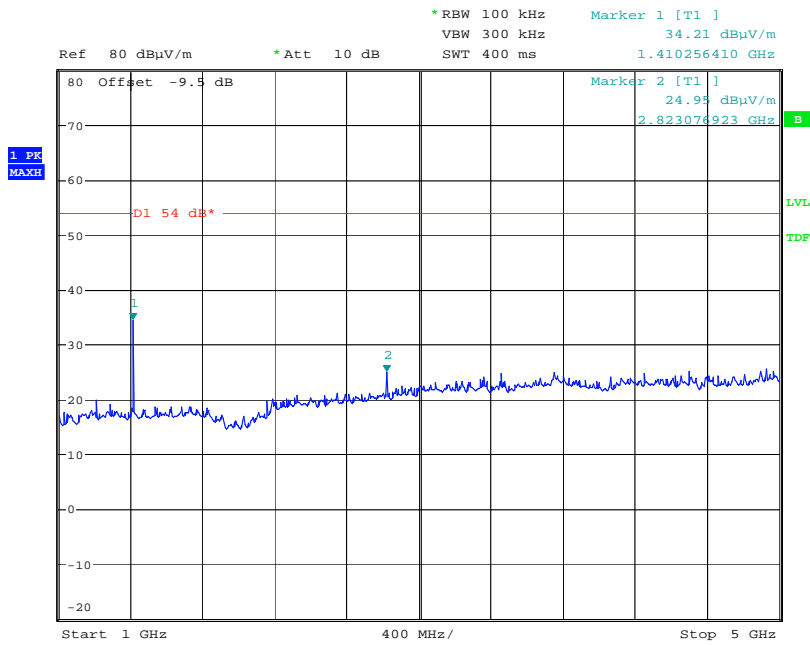


Date: 25.SEP.2009 11:00:27

13GHz – 17GHz



30MHz – 1000MHz

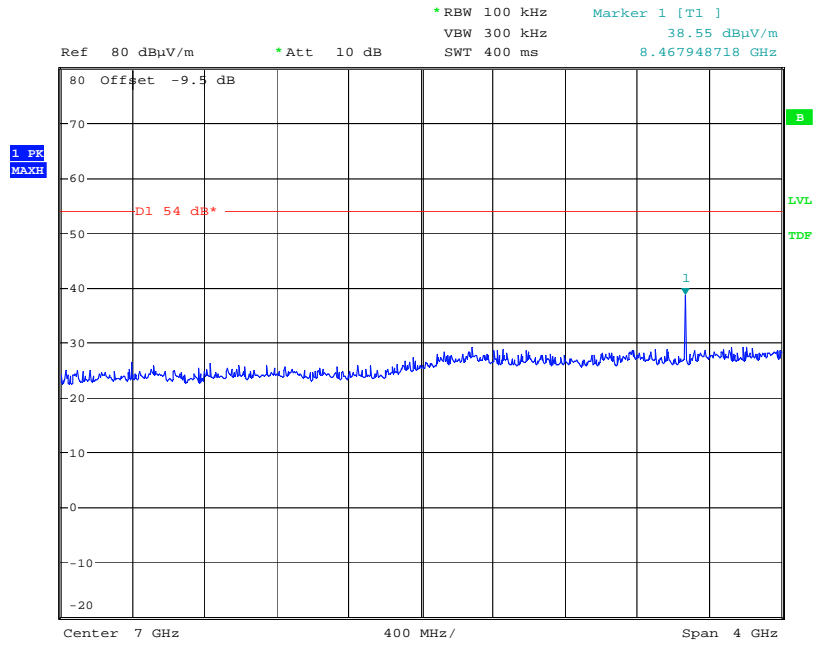


Date: 25.SEP.2009 11:34:46

1GHz – 5GHz

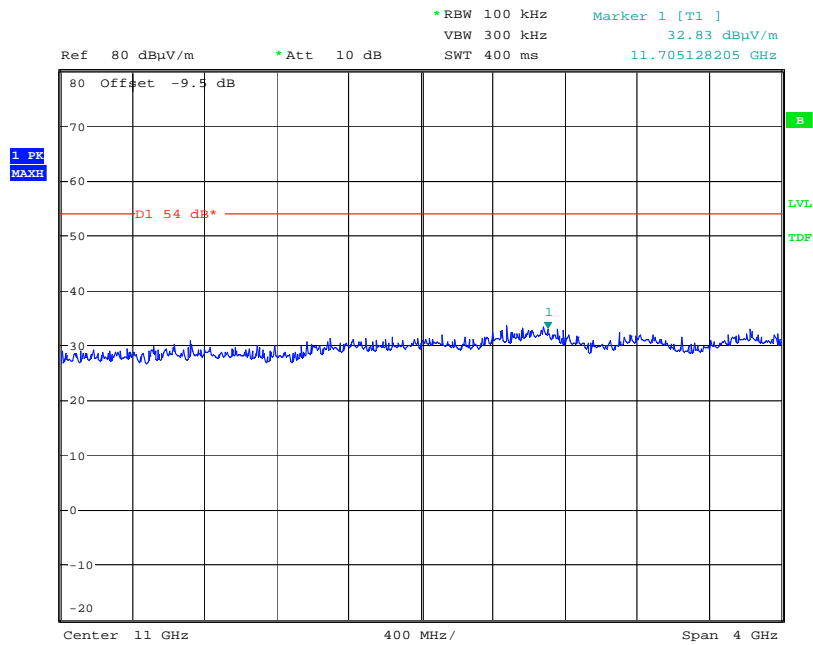
UNINTENTIONAL SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 25.SEP.2009 11:35:03

5GHz – 9GHz

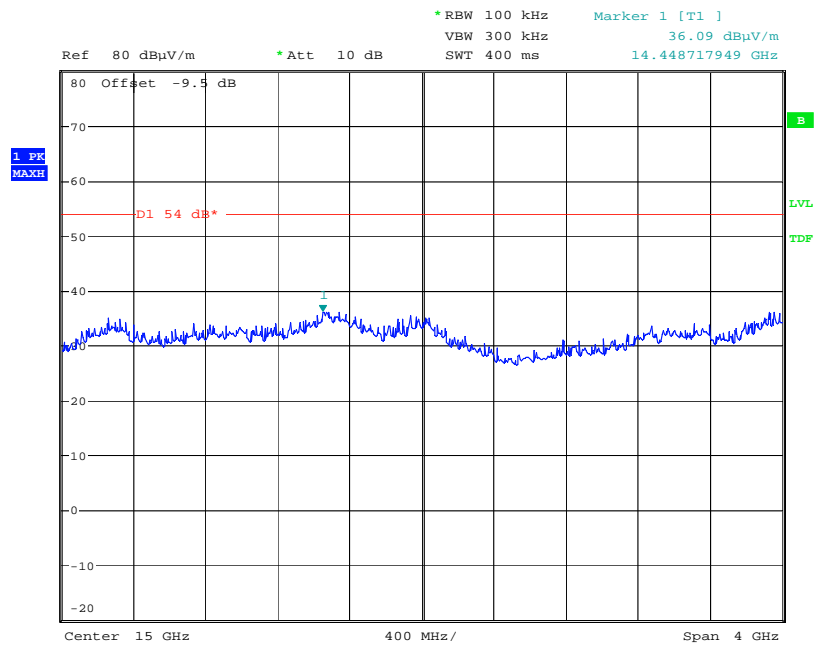


Date: 25.SEP.2009 11:35:23

9GHz – 13GHz

UNINTENTIONAL SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 25.SEP.2009 11:35:37

13GHz – 17GHz